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New Nouveau
Brunswick

Natural Resources and Energy
Minerals, Policy and Planning

Mineral Resource Report

New Brunswick's Mineral Industry *2001*

Edited by
Barbara M.W. Carroll

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Mineral Resource Report 2002-3

New Brunswick's Mineral Industry 2001

This report has been prepared by:

Minerals, Policy and Planning Division
Department of Natural Resources and Energy
Province of New Brunswick

Hon. Jeannot Volpé
Minister of Natural Resources and Energy

November, 2002

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New Nouveau
Brunswick

Natural Resources and Energy
Minerals and Energy

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MINERALS AND ENERGY DIVISION

Fredericton Office (1350 Regent St., Fredericton)
P.O. Box 6000, Fredericton, N.B. E3B 5H1
Telephone: (506) 453-2206
Fax: (506) 453-3671
E-mail: linda.dipaolo@gnb.ca
Internet: http//www.gnb.ca/0078/minerals/

Bathurst Office (495 Riverside Dr., Bathurst)
P.O. Box 50, Bathurst, N.B. E2A 3Z1
Telephone: (506) 547-2070
Fax: (506) 547-7694
E-mail: nicole.cormier@gnb.ca

Sussex Office (207 Picadilly Rd., Sussex)
P.O. Box 5040, Sussex, N.B. E4E 5L2
Telephone: (506) 432-2010
Fax: (506) 432-2060
E-mail: malcolm.mcleod@gnb.ca

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Division staff and others who contributed sections to this report are:

B. Harris
Dr. S.R. McCutcheon
J.P. Langton
J. Walker
R. Wilson
M. Parkhill
D. Bérubé
M.J. McLeod
S. Johnson
L.R. Fyffe
C. St. Peter
A.G. Pronk
A.A. Seaman
M.P. Rennick
S. Merlini
B.M.W. Carroll
S.K. McEwan
C.J. Griggs
C. Neumann
J.J. Thibault
T.C. Webb
M.O'Donnell
R.D. Shaw
R. Phillips
D.J.J. Carroll
C.M. McNeill-Dobbelsteyn
D. Curtis
T. Taylor
J. Hazen

Rhonda Doiron prepared the maps and D.J.J. Carroll prepared the graphs.

SUMMARY

The Minerals and Energy Division of the New Brunswick Department of Natural Resources and Energy manages the mineral resources owned by the Crown. Responsibilities include conducting basic geoscientific studies, maintaining scientific and technical data to aid mineral exploration, developing mineral management policies, issuing licences and leases, administering acts and regulations related to minerals and mining, and monitoring mining activities. Staff geologists and engineers work with other government departments, companies, and organizations on matters related to forestry, environment, and construction. The division published approximately 61 maps and 13 reports in 2001.

The Recorder received 96 mineral exploration reports of work during 2001. Prospectors, and exploration and mining companies recorded 2232 claims, mainly in search of zinc, lead, copper, and gold.

The focus of exploration in northern New Brunswick was base metals. Noranda Inc., Hudson Bay Exploration and Development Co. Limited and CanZinco Ltd. reported the largest amount of exploration. Diamond drilling and geophysical surveys were carried out on a number of properties. Precious metals and base-metal sulphides were the focus of exploration in southern New Brunswick. Most activity was related to the expansion of resources on known gold properties and the search for new gold occurrences in the southwestern part of the province. Recently, the potential for substantial gold deposits associated with Sn–W-bearing granites has been demonstrated. Gold may also be associated with granite of the Pokiok Batholith. Much interest has been shown in these and other areas in the region that may host additional intrusion-related gold occurrences. In addition, there was interest in the Province's limestone, aggregate, dimension stone, potash, and peat resources.

Corridor Resources Inc., Jean Mariadassou, Columbia Natural Resources Canada, Ltd., J.A. Seglund Inc., Potash Corporation of Saskatchewan Inc., Corridor Resources Inc./Potash Corporation of Saskatchewan Inc., and Norton Energy Corp. held oil and natural gas licences to search in 2001. Irving Oil Limited, Columbia Natural Resources Canada, Ltd., J.A. Seglund, and RHT Enterprises Ltd. held oil and natural gas leases. Three-D GeoConsultants Limited held a bituminous shale development permit. St. Clair Pipelines (1996) Ltd. and Intragaz held underground storage licences.

During the year, there was one producing metal mine and 97 producing nonmetal mines, including 37 peatlands and approximately 50 mineral aggregate pits and quarries on Crown and private land. One company was involved in coal production. Operations remained suspended at the Caribou and Restigouche mines (CanZinco Ltd.), the Murray Brook mine (Murray Brook Resources Inc.), the Lake George mine (APOCAN Inc.), and the Mount Pleasant mine (Adex Mining Inc.).

The value of New Brunswick's mineral production for 2001 was $789 196 489, a 2% increase over the 2000 figure ($772 546 475). The value of production for metals increased by 8% while the value of nonmetal, fuel, and structural material production decreased by 10%, 13% and 8%, respectively. Compared to mineral production in other Canadian provinces, New Brunswick's production ranked first in zinc, lead, antimony, and bismuth; second in silver and peat; and third in cadmium and sulphur (in smelter gas). New Brunswick is the only producer of marl.

SOMMAIRE

La Division des ressources minières et de l'énergie du ministère des Ressources naturelles et de l'Énergie du Nouveau-Brunswick est chargée de la gestion des ressources minérales de la Couronne. Parmi les responsabilités de cette division, on note les levés géoscientifiques de base, le maintien à jour des données scientifiques et techniques servant à la prospection minière, l'élaboration de politiques de gestion minière, la délivrance de permis et de baux, l'administration des lois et des règlements relatifs aux minéraux et aux mines ainsi que le contrôle des activités minières. Les géologues et les ingénieurs de la Division travaillent en étroite collaboration avec les autres ministères ainsi qu'avec les représentants d'entreprises et d'organismes, sur les questions relatives à la foresterie, à l'environnement et à la construction. En 2001, la Division des ressources minières et de l'énergie a publié environ 61 cartes et 13 rapports.

En 2001, l'archiviste aux mines a reçu 96 rapports de travaux d'exploration minière. Les prospecteurs miniers ainsi que les sociétés d'exploration et les sociétés minières ont jalonné un total de 2232 claims, surtout pour la recherche de zinc, de plomb, de cuivre et d'or.

La prospection dans le Nord du Nouveau-Brunswick a principalement été axée sur les métaux communs. La Noranda Inc., l'Hudson Bay Exploration and Development Co. Limited et la CanZinco Ltd. ont été les sociétés les plus actives à cet égard. Des travaux de forage au diamant et des levés géophysiques ont été exécutés sur un certain nombre de concessions. Les métaux précieux et les sulfures de métaux communs ont constitué le principal objectif des travaux de prospection réalisés dans le Sud du Nouveau-Brunswick. La majeure partie de l'activité a été reliée à l'expansion des ressources des concessions aurifères reconnues et à la recherche de nouvelles venues d'or dans le Sud-Ouest de la province. Les chercheurs ont récemment démontré l'existence possible de gîtes aurifères substantiels associés aux granites abritant du Sn–W. Une présence d'or pourrait également être associée au granite du batholite de Pokiok. Les sociétés one fait preuve de beaucoup d'intérêt à l'égard de ces emplacements et d'autres secteurs de la région qui pourraient abriter des venues aurifères apparentées à des intrusions. On s'est également intéressé aux ressources en calcaire, en agrégats, en pierre de taille, en potasse et en tourbe de la province.

La Corridor Resources Inc., M. Jean Mariadassou, la Columbia Natural Resources Canada, Ltd., la J.A. Seglund Inc., la Potash Corporation of Saskatchewan Inc., La Corridor Resources Inc/la Potash Corporation of Saskatchewan Inc., la Norton Energy Corp. étaient titulaires de permis de recherche de pétrole et de gaz naturel en 2001. L'Irving Oil Limited, la Columbia Natural Resources Canada, Ltd., la J.A. Seglund Inc. et la RHT Enterprises Ltd. étaient titulaires des baux d'exploitation de pétrole et de gaz naturel. La Three-D GeoConsultants Limited était titulaire d'une autorisation de mise en valeur de schistes bitumineux. La St. Clair Pipelines (1996) Ltd. et Intragaz étaient, respectivement, titulaires des permis de stockage souterrain.

Durant l'année, une mine métallique était productive ainsi que 103 mines non métalliques, y compris 37 tourbières et environ 50 carrières, gravières et sablières de granulat minéral situées sur des terres de la Couronne et des terrains privés. Une entreprise a produit du charbon. Les activités aux mines Caribou et Restigouche (CanZinco Ltd.), à la mine Murray Brook (Murray Brook Resources Inc.), à la mine de Lake George (APOCAN Inc.) et à la mine de Mount Pleasant (Adex Mining Inc.) sont toujours suspendues.

La valeur de la production de minéraux au Nouveau-Brunswick se chiffrait en 2001 à 789 196 489 $, ce qui représente une augmentation de 7 % par rapport à sa valeur de 2000 (772 546 475 $). La valeur de la production de métaux a augmenté de 8 %, alors que celle de la production de métalloïdes, de combustibles et de matériaux de construction a diminué par 10 %, 13 % et 8 %, respectivement. Par rapport aux autres provinces canadiennes, le Nouveau-Brunswick se classe premier pour la production de zinc, de plomb, d'antimoine, et de bismuth; deuxième pour celle d'argent et de tourbe; et troisième pour celle de cadmium et de sulfure (dans le gaz de four de fusion). Le Nouveau-Brunswick est le seul producteur de marne au Canada.

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CHAPTER 1.
GOVERNMENT ORGANIZATION AND PROGRAMS

MINERALS AND ENERGY DIVISION

Donald E. Barnett, Assistant Deputy Minister

The New Brunswick Department of Natural Resources and Energy is responsible for managing the province's mineral and energy resources. In addition, it is the provincial agency responsible for mineral and energy policy.

The Minerals and Energy Division manages mineral and energy exploration, mine development, mineral processing and mine reclamation. The division also promotes the mineral and energy resource potential of the province, encourages exploration and extraction and the efficient use of energy. The mission of the division is to "identify and manage mineral and energy resources and optimize their economic contribution while sustaining environmental quality."

The Mineral Policy released in December 1993 and the Energy Policy of December 1990 form the basis of government's commitment to the long-term management of mineral and energy resources and support for development of each sector in a manner to both increase and sustain the economic value for present and future generations, whilst ensuring protection of the environment.

The New Brunswick Policy on Peat Mining was officially released by Hon. Jeannot Volpé on Tuesday, November 6, 2001 at the Division's Review of Activities. Highlights of the new peat policy include:

(a) Allocation of peatlands through a bidding process.
(b) The royalty is increased from $0.08 to $0.10 per standard bale and is accompanied by a $0.04 / bale rebate on value-added peat production.
(c) New projects or expansion of existing operations must be tied to valued-added activities (an absolute ceiling is placed on the production of unprocessed peat on Crown lands). Consideration is given for replacing lands coming out of production.
(d) Lessees are required to file a site abandonment plan and be financially committed to site restoration or reclamation.
(e) Government financial assistance is limited to regular programs or industry-wide issues.
(f) Option agreements cease to be used to manage the resource. Current options remain valid until their expiration (the last agreements will expire in April 2004).
(g) Feeder operations: projects undertaken on peatlands of less than 40 ha surface area are excluded from the value-added criteria.

The services of Michael J. Day and Paul Lawrence Precht were acquired to review and make amendments to the *Oil and Natural Gas Act* (*ONG Act*) in two phases. Phase 1, land tenure and consequential amendments were completed with the proclamation of an amended Act and Regulations in October 2001. Phase 2 was initiated in the fall of 2001 and will involve the drafting of an onshore drilling and production regulation, the preparation of a hydrocarbon royalty model suitable for regulatory drafting and a proposal for amendments to the geophysical regulation.

The five-year federal–provincial NATMAP Program continued into 2001.

The New Brunswick Junior Mining Assistance Program (NBJMAP), and Propsector Assistance Program (NBPAP) were introduced in 2001 with a budget of $600 000 ($350 000 for NBJMAP and $250 000 for NBPAP).

The Minerals and Energy Division consists of three branches: Geological Surveys, Mines, and Energy Secretariat. Organizational changes are shown in Figure 1a to 1e.

The 2001–2002 expenditures from the Division's A-base budget, from other provincial funds, and from federal/provincial agreements are summarized in Table 1 and Figure 2. Scientific, technical, administrative, and casual personnel employed by the Province in support of its mineral resources totalled 57 for 2001–2002.

Clientele of the Minerals and Energy Division are primarily mineral and energy resource companies, consultants, and associations. As well, many government departments and agencies and other resource-related industries utilize the geoscientific information generated by staff. In addition, staff provided direct advice into many government decisions on minerals and energy production and use at interprovincial and national levels. The Division continues to subscribe to the objective of providing quality service to all clients, delivered in an efficient and cost-effective manner.

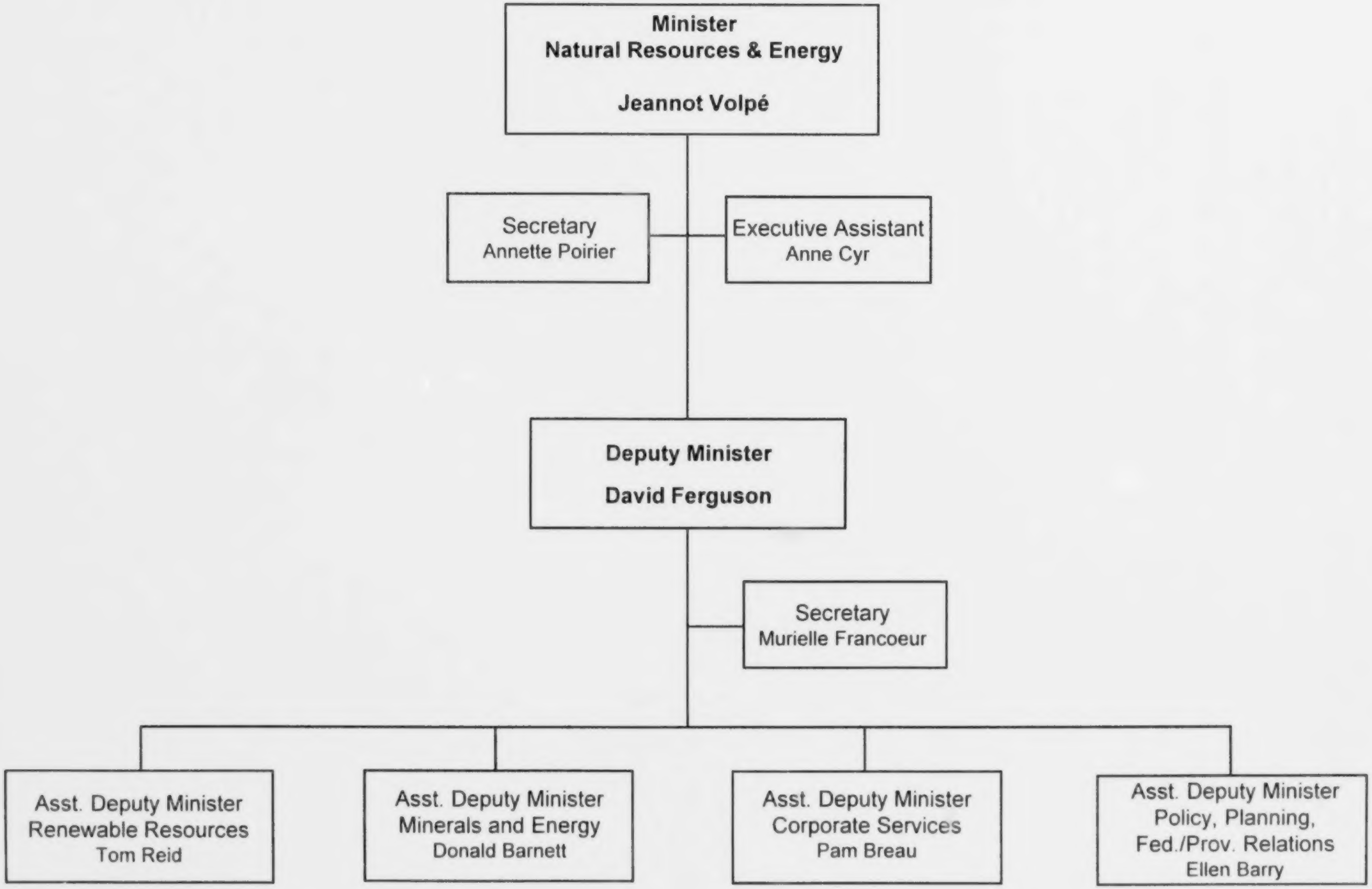
Geological Surveys Branch

Rao R. Irrinki, Director

The Geological Surveys Branch is responsible for building and maintaining a comprehensive geoscience database for the province and using it to assist mineral exploration and development, as well as to advise government and the public regarding land use. The branch has a staff of 25 and 2 regional offices, one in Bathurst and the other in Sussex. The Regional Offices provide direct contact with the mineral industry based in northern and southern New Brunswick, respectively. The major activities of the branch are geological mapping, mineral deposit studies and inventory, geophysical and geochemical surveys, management of exploration assistance programs, and distribution of digital geoscience information. The specific responsibilities of the branch are: (a) to map and publish data on the bedrock and surficial geology of New Brunswick; (b) to maintain an up-to-date inventory of mineral and energy resources of New Brunswick. These resources include metallic minerals such as base metals, gold, tin and nickel; nonmetallic or industrial minerals such as potash, gypsum, limestone and peat; and energy resources such as oil and natural gas, bituminous shale and coal; (c) to assist the mineral and energy industry in its search for mineral and energy deposits by developing exploration models, identifying areas for exploration and development and providing a geoscience knowledge base; (d) to map coastal geomorphology and investigate environmental sensitivities of the coastline; (e) to manage drill core, exploration assistance programs and mineral exploration reports of work; (f) to computerize and maintain geoscience and mineral data by using the Geoscience

Editor's Note: Projects commonly consist of a number of phases that are carried out by staff from different sections and branches of the Division. In order to find all the information on particular projects mentioned in this chapter, please refer to the index; the list of references for publications completed in 2001 is at the end of Chapter 1.

New Brunswick Department of Natural Resources and Energy


Minister
Natural Resources & Energy
Jeannot Volpé
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Annette Poirier
Executive Assistant
Anne Cyr
Deputy Minister
David Ferguson
Secretary
Murielle Francoeur
Asst. Deputy Minister
Renewable Resources
Tom Reid
Asst. Deputy Minister
Minerals and Energy
Donald Barnett
Asst. Deputy Minister
Corporate Services
Pam Breau
Asst. Deputy Minister
Policy, Planning,
Fed./Prov. Relations
Ellen Barry

Figure 1a. Organization chart for the New Brunswick Department of Natural Resources and Energy (December, 2001).

Minerals and Energy Division

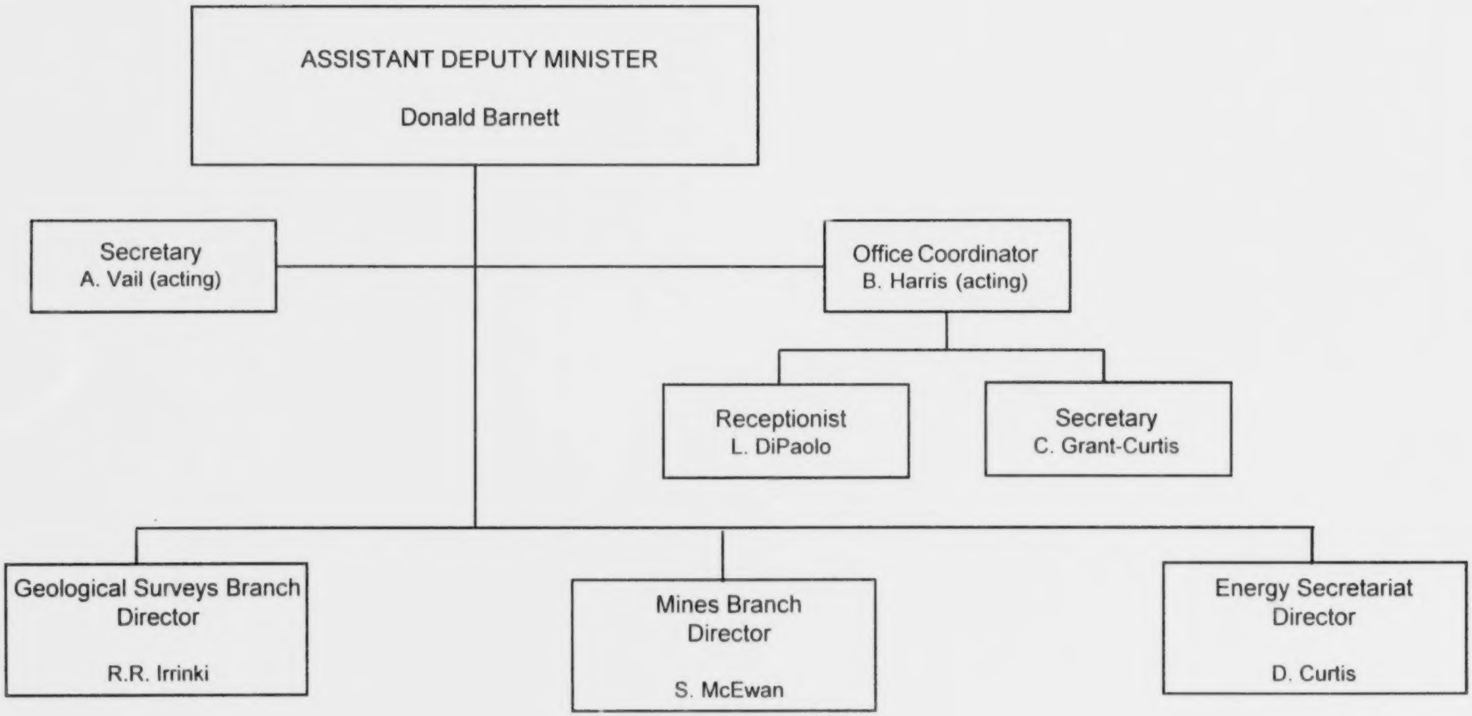
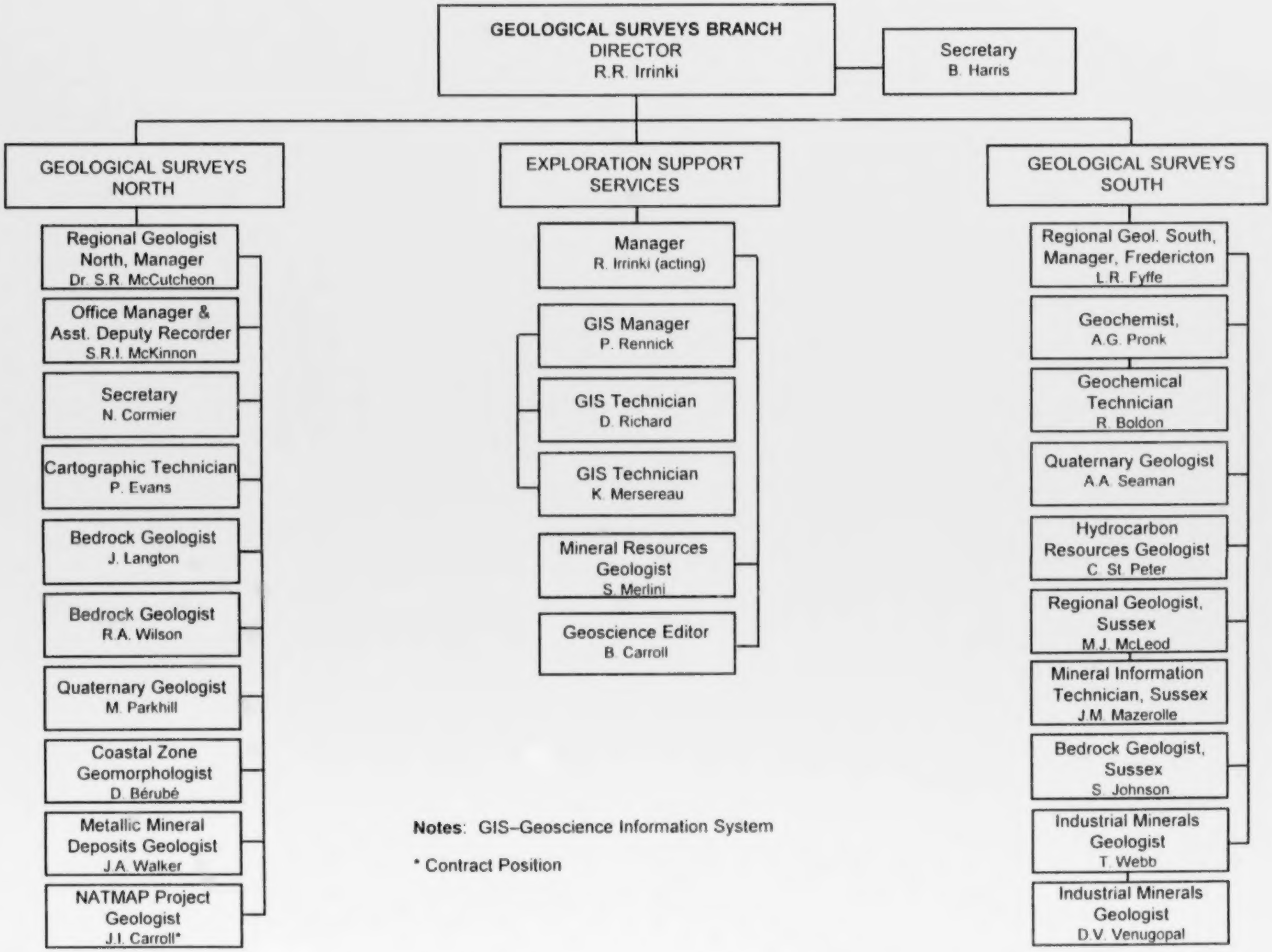

ASSISTANT DEPUTY MINISTER
Donald Barnett
Secretary
A. Vail (acting)
Office Coordinator
B. Harris (acting)
Receptionist
L. DiPaolo
Secretary
C. Grant-Curtis
Geological Surveys Branch
Director
R.R. Irrinki
Mines Branch
Director
S. McEwan
Energy Secretariat
Director
D. Curtis

Figure 1b. Organization chart for the Minerals and Energy Division (December, 2001).

Geological Surveys Branch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DIRECTOR
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Secretary
B. Harris
GEOLOGICAL SURVEYS NORTH
Regional Geologist North, Manager
Dr. S.R. McCutcheon
Office Manager & Asst. Deputy Recorder
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Secretary
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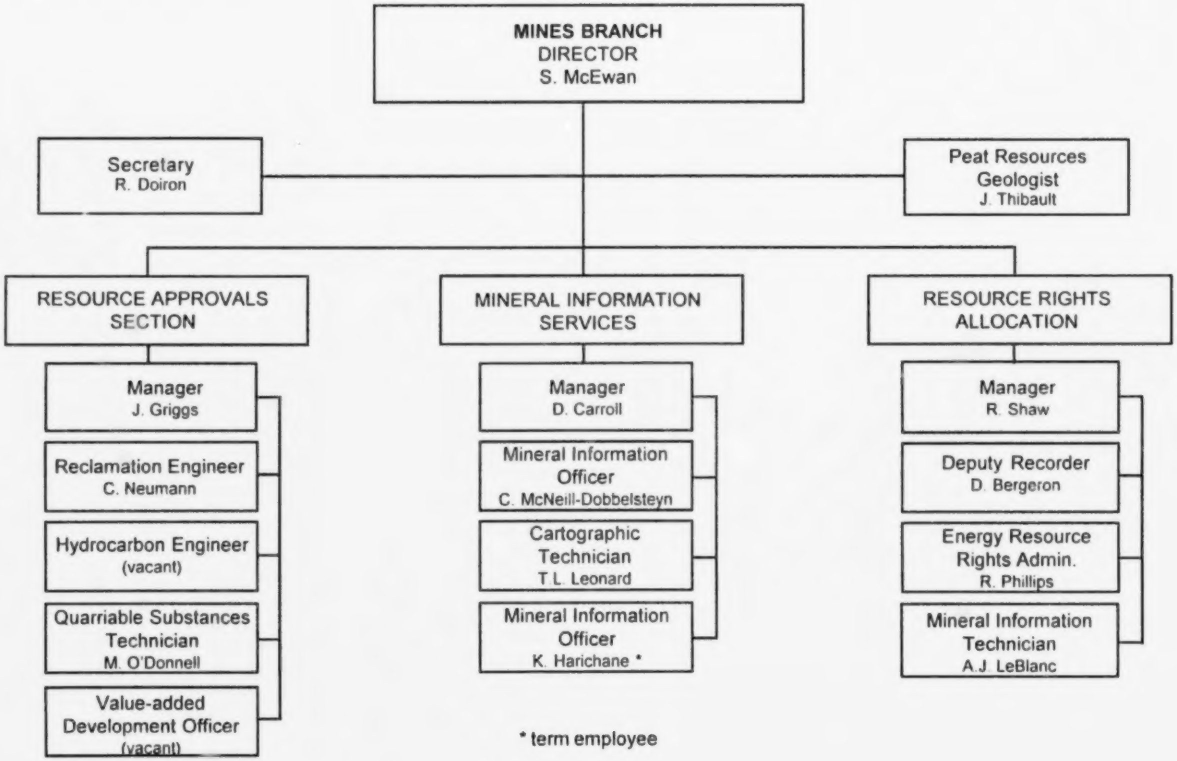
Cartographic Technician
P. Evans
Bedrock Geologist
J. Langton
Bedrock Geologist
R.A. Wilson
Quaternary Geologist
M. Parkhill
Coastal Zone Geomorphologist
D. Bérubé
Metallic Mineral Deposits Geologist
J.A. Walker
NATMAP Project Geologist
J.I. Carroll*
EXPLORATION SUPPORT SERVICES
Manager
R. Irrinki (acting)
GIS Manager
P. Rennick
GIS Technician
D. Richard
GIS Technician
K. Mersereau
Mineral Resources Geologist
S. Merlini
Geoscience Editor
B. Carroll
GEOLOGICAL SURVEYS SOUTH
Regional Geol. South, Manager, Fredericton
L.R. Fyffe
Geochemist,
A.G. Pronk
Geochemical Technician
R. Boldon
Quaternary Geologist
A.A. Seaman
Hydrocarbon Resources Geologist
C. St. Peter
Regional Geologist, Sussex
M.J. McLeod
Mineral Information Technician, Sussex
J.M. Mazerolle
Bedrock Geologist, Sussex
S. Johnson
Industrial Minerals Geologist
T. Webb
Industrial Minerals Geologist
D.V. Venugopal

Notes: GIS–Geoscience Information System

* Contract Position

Figure 1c. Organization chart for the Geological Surveys Branch (December, 2001).

Mines Branch


MINES BRANCH
DIRECTOR
S. McEwan
Secretary
R. Doiron
Peat Resources
Geologist
J. Thibault
RESOURCE APPROVALS
SECTION
MINERAL INFORMATION
SERVICES
RESOURCE RIGHTS
ALLOCATION
Manager
J. Griggs
Reclamation Engineer
C. Neumann
Hydrocarbon Engineer
(vacant)
Quarriable Substances
Technician
M. O'Donnell
Value-added
Development Officer
(vacant)
Manager
D. Carroll
Mineral Information
Officer
C. McNeill-Dobbelsteyn
Cartographic
Technician
T L. Leonard
Mineral Information
Officer
K. Harichane *
Manager
R. Shaw
Deputy Recorder
D. Bergeron
Energy Resource
Rights Admin.
R. Phillips
Mineral Information
Technician
A.J. LeBlanc

* term employee

Figure 1d. Organization chart for the Mines Branch (December, 2001).

Energy Secretariat

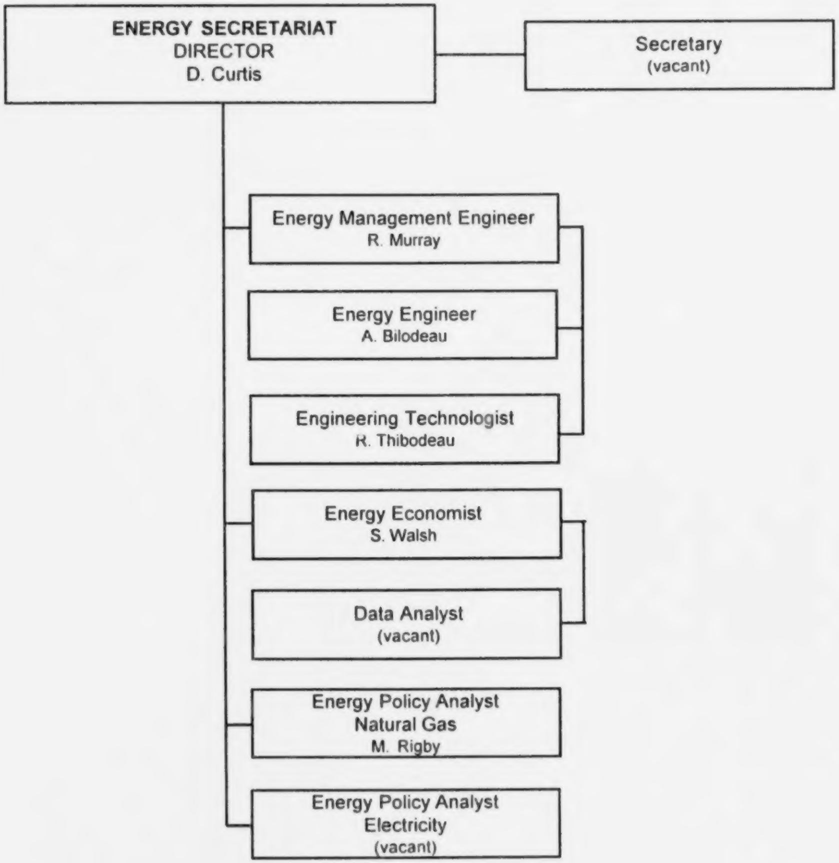

ENERGY SECRETARIAT
DIRECTOR
D. Curtis
Secretary
(vacant)
Energy Management Engineer
R. Murray
Energy Engineer
A. Bilodeau
Engineering Technologist
R. Thibodeau
Energy Economist
S. Walsh
Data Analyst
(vacant)
Energy Policy Analyst
Natural Gas
M. Rigby
Energy Policy Analyst
Electricity
(vacant)

Figure 1e. Organization chart for the Energy Secretariat (December, 2001).

Information System (GSIS); (g) to provide expert advice and consultation on land use planning and environmental issues.

The 2001–2002 ordinary budget for the Geological Surveys Branch was $2 502 300. Actual expenditures are shown in Table 1. The branch has three sections, namely Geological Surveys North, Geological Surveys South and Exploration Support Services (Figure 1c).

CONFERENCES / WORKSHOPS Rao Irrinki attended the Annual International Convention and Trade Show of the Prospectors and Developers Association of Canada that was held in Toronto in March of 2001. He also attended the Mines and Energy Ministers' Conference Quebec City in September. Rao Irrinki gave a presentation at the Review of Activities held in November.

COMMITTEES Rao Irrinki attended the Committee of Provincial Geologists held in conjunction with the Mines and Energy Ministers' Conference in Quebec City.

Table 1. Minerals and Energy Division
Expenditures, 2001–2002

Province of New Brunswick	
Mines Branch	$1 407 317.66
Geological Surveys Branch	2 227 691.35
Energy Secretariat	1 650 972.71
Total	**$5 285 981.72**
Province of New Brunswick / Natural Resources Canada Projects	
Appalachian Foreland & Platform Architecture (NATMAP)	75 000.00
Geochemical Survey, Central New Brunswick (NGR)	25 830.01
Province of New Brunswick (Dept. of Training & Employment Development)	
Drill Core Program	18 345.91
Province of New Brunswick (Regional Development Corporation)	
Exploration Assistance Programs (Junior Mining Assistance; Prospector Development)	534 315.37
Total	**$ 653 491.29**

Geological Surveys North

The main purpose of the Bathurst Regional Office is to provide basic scientific data that will help the mineral industry find and/or develop new mineable resources (both metallic and industrial mineral, including peat) in the northern half of the Province. This is accomplished by:

- maintaining a complete and readily accessible copy of the geoscience database of northern New Brunswick;
- gathering new geoscience data, integrating them with existing data and producing new geological maps and mineral potential models;

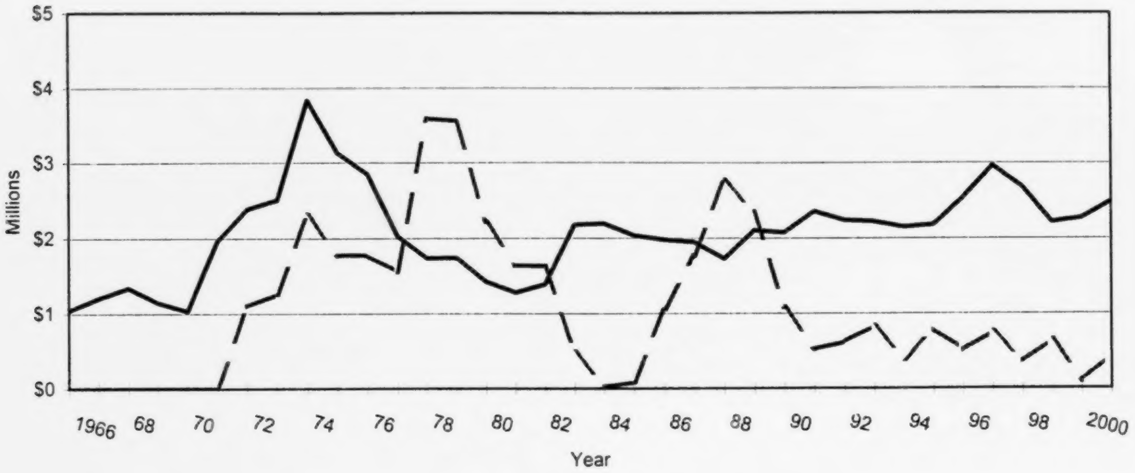


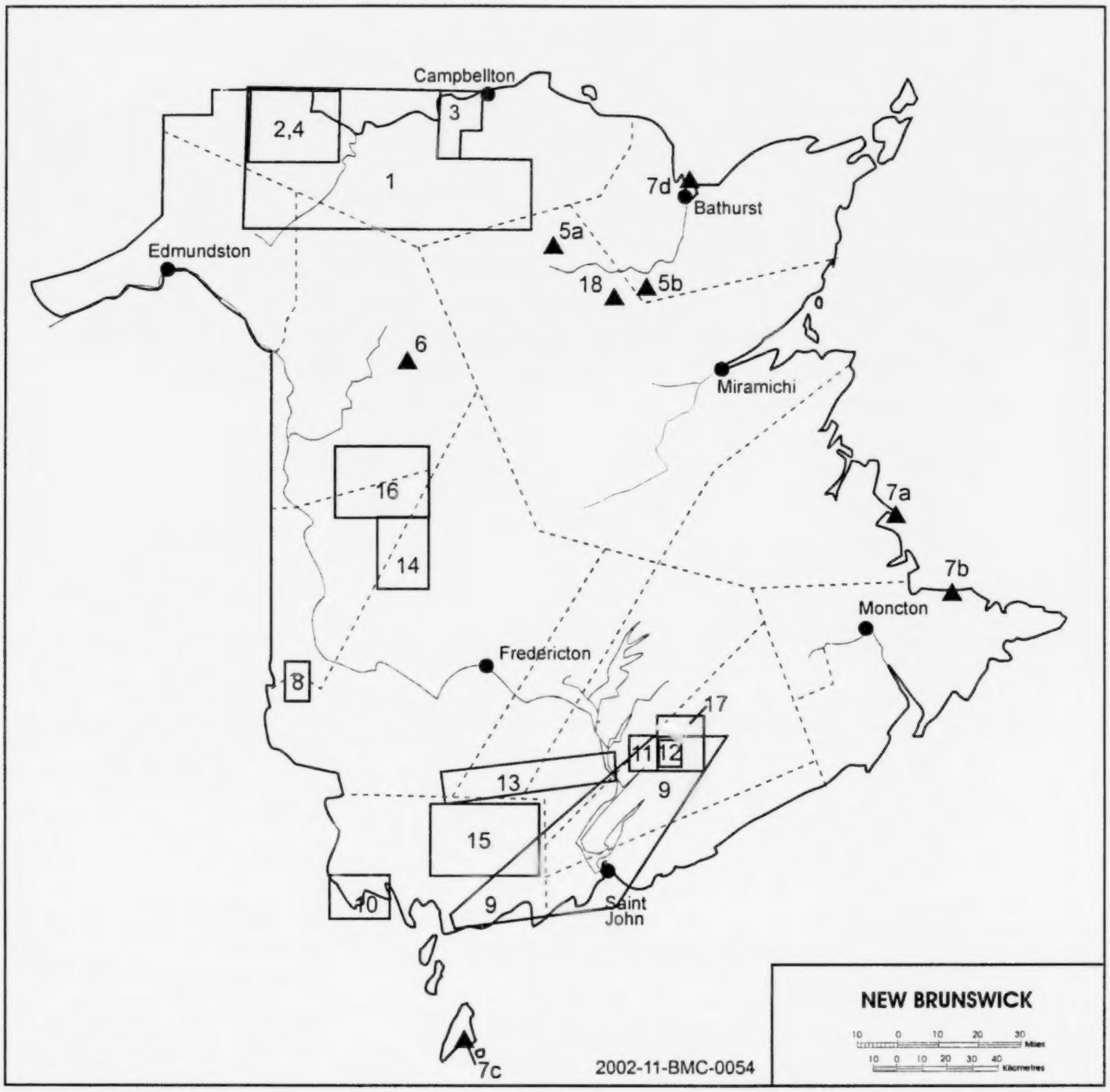
Figure 2. Minerals and Energy Division expenditures 1965 to 2001, excluding those of Energy Secretariat. Legend: —— Department A-base; - - - - - Federal/Provincial/other funding. ($ 1986 = 100)

- providing map and report reproduction services as well as exploration work histories on mineral properties;
- providing claims and lease information as well as claims recording services;
- providing geological consultation services/advice to mineral industry clients;
- encouraging investment by promoting the mineral potential through talks, poster displays and geoscientific publications on selected areas and/or topics;
- helping to maintain the diamond-drill-core library for northern New Brunswick at Madran.

The staff at the office includes Sharon McKinnon (Administrative Services Officer), Nicole Cormier (Secretary), André LeBlanc (Mineral Information Technician), Phillip Evans (Cartographic Technician), Dr. Steven McCutcheon (Manager/Regional Geologist), James Walker (Metallic Mineral Deposits Geologist), John Langton (Bedrock Geologist), Reginald Wilson (Bedrock Geologist), Michael Parkhill (Quaternary Geologist), Jacques Thibault (Peat Resources Geologist), Dominique Bérubé (Coastal Zone Geomorphologist), and Jeffrey Carroll (NATMAP Project Geologist). Janet-Lee Bannister, Marni Lynne Dickson, Denis Doucet, Art Hamilton, Julie LeBlanc, Kevin Loughead and Léa Olsen were hired as summer personnel in 2001.

EXTECH-II PROJECT The Economic Geology Monograph summarizing the results of this project did not get published in 2001 but is expected in 2002.

NATMAP PROJECT This five-year project involves three provinces and is being carried out through the Geological Survey of Canada–Québec Division, under the direction of Denis Lavoie and Daniel Lebel (GSC–Québec), Steven McCutcheon (New Brunswick Geological Surveys Branch) and Stephen Colemann-Sadd (Geological Survey of Newfoundland). It comprises five transects across the Laurentian continental margin, two of which extend across the Gaspé Belt into northwestern New Brunswick. Transect 3 trends south along the Matapédia River to the vicinity of Saint-Quentin. Transect 4 trends northeasterly from the end of Transect 3 toward Dalhousie, across the end of Gaspé to Anticosti Island and beyond (Figure 3: 1).


Campbellton
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Saint John
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Miles
Kilometres
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2002-11-BMC-0054

Figure 3. Areas in which Geological Surveys Branch and Mines Branch projects were conducted in 2001: (1) Geological Bridges project, Transects 3 and 4; Bedrock mapping (2) States Brook, (3) Atholville area; (4) Regolith mapping, States Brook; Mineral deposit studies: (5a) Camel Back, Mount Fronsac, Upsalquitch–Dungannon, (5b) CNE, (6) Shingle Gulch–Mount Costigan area; Coastal zone studies: (7a) Bouctouche Dune, (7b) L'Aboiteau Beach, (7c) Long Pond Beach, (7d) Youghall Beach; Bedrock mapping: (8) Meductic area, (9) Kingston and Brookville belts, (10) St. Stephen Gabbro and Baring Granite, (11) Devil Pike Brook area, (12) Springfield area; (13) Carboniferous studies, southern part of New Brunswick Platform; (14) Till geochemistry, Coldstream East; (15) Surficial mapping and till geochemistry, Rollingdam; (16) Stream-sediment and water survey, Juniper; (17) Magnetite–ilmenite–apatite, Stewarton area; (18) Reclamation, Heath Steele property.

Bedrock mapping was undertaken in transects 3 and 4 as part of NATMAP. Jeffrey Carroll, assisted by Kevin Loughead, carried out 1:50 000 scale mapping under a NATMAP contract in the States Brook (NTS 21 O/13) map area (Figure 3: 2). Reginald Wilson carried out bedrock mapping at 1:20 000 scale in parts of the Atholville map area (NTS 21 O/15d, 21 O/15e and 21 O/15f; Figure 3: 3) under A-base funding.

Regolith mapping was undertaken under A-base funding in Transect 3 at 1:50 000 scale, as part of NATMAP as well. Michael Parkhill, assisted by Denis Doucet, collected 1075 till samples in the States Brook (NTS 21 O/13) map area (Figure 3: 4).

MINERAL DEPOSIT STUDIES James Walker continued to field check occurrences and enter data into the Mineral Occurrence Database. Assisted by Janet-Lee Bannister and Art Hamilton, he logged and sampled cores from the Camel Back, Mount Fronsac, Upsalquitch–Dungannon deposits (Figure 3: 5a) and CNE deposit (Figure 3: 5b). In addition, he continued to work part time on deposits in the Shingle Gulch–Mount Costigan area of the Tobique–Chaleur zone (Figure 3: 6) for his M.Sc. thesis at the University of New Brunswick.

COASTAL ZONE Dominique Bérubé, assisted by Julie LeBlanc and Léa Olsen, carried out coastal erosion studies. Aerial photos from 1945, 1973 and 1996 were digitized at high resolution (CARIS) to analyze coastline (dune) and shoreline (beach) changes at Miscou Island and Bouctouche Spit. Dominique continued to monitor erosional/depositional changes (beach profiles) at Bouctouche Dune, L'Aboiteau Beach, Long Pond Beach, and Youghall Beach (Figure 3: 7a-d).

CONFERENCES / FIELD WORKSHOPS / COURSES The Bathurst staff promoted the geology and mineral potential of northern New Brunswick by displaying posters and giving oral presentations at a number of conferences. In May, Steve McCutcheon and Reg Wilson attended and presented talks at the Geological Association of Canada–Mineralogical Association of Canada Joint Annual Meeting in St. Johns. Steve McCutcheon and Jim Walker led a post-meeting field trip to the Bathurst Mining Camp. During the same month, Dominique Berubé attended and presented a poster at the Coastal Zone Canada Conference in Quebec City. In late September, Jim Walker and Steve McCutcheon led NEIGC field trips in northern and southern New Brunswick, respectively. Jeff Carroll and Steve McCutcheon also went on a one-day NEIGC trip into eastern Maine. In early November, several staff members of the Bathurst office presented talks and/or posters at the New Brunswick Minerals and Energy Division's Annual Review of Activities. Abstracts for oral presentations and posters at these conferences are listed at the end of this chapter. In January, Jeff Carroll participated in a NATMAP workshop in Québec City. In February, John Langton, Michael Parkhill and Reg Wilson attended the Colloquium and Annual General Meeting of the Atlantic Geoscience Society in Antigonish. In March, Jim Walker attended and helped staff the Geological Surveys Branch display at the Annual International Convention and Trade Exposition of the Prospectors and Developers Association of Canada in Toronto.

PUBLICATIONS Both internal and external publications were prepared by the Bathurst staff. Of the eight papers in "Current Research 2000" (Mineral Resource Report 2001-4), three were contributed by geologists from the Bathurst office. In addition, Jeff Carroll published a paper in Geological Survey of Canada's Current Research 2002-D5. Four staff members contributed to the new Geological Survey of Canada map of the Bathurst Mining Camp (GSC Open File 4182).

COMMITTEES In 2001, Steve McCutcheon sat on both the New Brunswick Junior Mining Assistance Program (NBJMAP) and the New Brunswick Prospector Assistance Program (NBPAP) committees. He was a member of the Continued Competency Assurance Committee of the Association of Professional Engineers and Geoscientists of New Brunswick (APEGNB), an Associate Editor of Exploration and Mining Geology, and

Finance Chair of the Geological Association of Canada. Michael Parkhill finished his term as Past-President of the Atlantic Geoscience Society (AGS). Reg Wilson became the Vice-President of AGS and was a member of the Legislation Committee of the APEGNB. Dominique Bérubé was a member of the New Brunswick Coastal Standards Development Committee and the Bouctouche Dune Scientific Advisory Committee.

OTHER ACTIVITIES During the year, the staff provided geological consulting and/or exploration support services to geologists and prospectors, both in the office and the field. Visits were made to mineral properties held by the following companies: Eastmain Resources Inc., Heron Mines Ltd., Hudson Bay Exploration & Development Co. Limited, Log House Construction Ltd., Noranda Inc. and Slam Exploration Ltd.

Field trips, office tours and class presentations were given to students by M.Parkhill, J. Walker and R. Wilson. S. McCutcheon acted as external examiner for L. Mireku's M.Sc. thesis at Acadia University. D. Berubé co-supervised M. Giangioppi's M.Sc. thesis at the Université de Moncton. Staff also participated in the Job Shadowing and Youth Apprenticeship programs with students from Bathurst High School.

Geological Surveys South

Geological Surveys South staff, located at the Hugh John Flemming Forestry Centre in Fredericton, consists of Les Fyffe (Manager), Clinton St. Peter (Hydrocarbon Resources Geologist), Allen Seaman (Quaternary Geologist), Toon Pronk (Geochemist), Rex Boldon (Geochemical Technician), Tim Webb (Industrial Minerals Geologist) and D.V. Venugopal (Industrial Minerals Geologist).

Staff at the Picadilly Road office in Sussex consists of Malcolm McLeod (Regional Geologist), Susan Johnson (Bedrock Geologist) and Maurice Mazerolle (Engineering Technician). Erin Smith and Josh Cameron (students) was hired for the summer.

Geological mapping was carried out in the Meductic area of west-central New Brunswick by Les Fyffe. The Paleozoic bedrock of the Pocowogamish Stream area, at a scale of 1:20 000, was published as a result of this work (NTS 21 G/13g; Figure 3: 8). In addition, Sean McClenaghan, under the supervision of Dr. David Lentz of the University of New Brunwick, logged and collected samples for analysis from some recent exploration holes in the Meductic area.

Sandra Barr of Acadia University was partially funded by the Department of Natural Resources and Energy while continuing her research and mapping in southwestern New Brunswick (Figure 3: 9). Maps of the entire Kingston and Brookville belts have been compiled and published at 1:20 000 scale (21 G/01c,d,e,f,g,h; 21 G/02a,b,c,g,h; 21 G/08a,b,c,d,g,h; and 21 H/05d,e,f; 21 H/12b,c,d,f,g). Samples collected from the Caledonia, Brookville, Kingston and Mascarene terranes are being radiometrically dated by Brent Miller at the University of North Carolina; 12 samples have now been processed. Kirsten McLaughlin of Acadia University (M.Sc. thesis supervised by S. Barr) is completing her study of the St. Stephen Gabbro and Baring Granite (part of NTS 21 G/03) (Figure 3: 10).

SUSSEX REGIONAL OFFICE The Sussex Regional Office is an amalgamated facility that houses the Geological Surveys and District Forest Ranger staff. During 2001, the staff continued to provide ready access to government reports and maps, the drill-core facility and to technical equipment. Consultation services were provided throughout the year to the exploration community, to other government agencies and engineering firms, and to academic institutions. Other work included tasks associated with all aspects of claim staking and recording, and promotion of southern New Brunswick's mineral industry via regional-scale and site-specific field trips and oral presentations. The office is also a base from which some of the bedrock geological mapping projects were conducted.

Malcolm McLeod completed a preliminary 1:20 000 scale bedrock mapping program to delineate the distribution of Lower to Upper Paleozoic units in the Devil Pike Brook (NTS 21 H/12e) area (Figure 3: 11).

Susan Johnson, assisted by Erin Smith during the summer continued 1:20 000 scale mapping to unravel the stratigraphic and structural relationships in the Sprinfield (NTS 21 H/12f) area (Figure 3: 12). In conjunction with Clinton St. Peter, work on the final report for the NATMAP Magdalen Basin project continued.

Maurice Mazerolle provided technical assistance in the preparation of geological maps, figures and diagrams for plates, presentations and publications. He also continued to compile diamond-drill-hole and trench information in the southern part of the province, and oversaw reorganization of core at the Sussex core-storage facility with the help of Josh Cameron.

CARBONIFEROUS GEOLOGICAL SURVEYS (Clinton St. Peter) Field work was undertaken on Carboniferous rocks along the southern part of the New Brunswick Platform between Oromocto Lake and Queenstown (Figure 3: 13). This was the second part of a study initiated in 1999. The objectives of the investigation were to assess the hydrocarbon and industrial mineral potential of the Lower Carboniferous terrestrial Piskahegan Group and overlying marine Windsor Group and to spore-date, where possible, all Carboniferous formations in the area. The most significant findings were: (1) no oil or gas shows or organic-bearing potential source rocks were identified, and (2) marine Windsor Group strata are more widely distributed than previously known or suspected. The latter fact has implications for evaporite deposits down-dip to the north in the Marysville Subbasin.

QUATERNARY GEOLOGY (Allen Seaman) Till geochemistry investigations in the Coldstream (NTS 21 J/06) map area were begun in 1998 and continued in 2000. Most of this earlier work was carried out in the western half of the map area. In 2001, till sampling was completed in the eastern half of the Coldstream map area (Figure 3: 14). Samples were also collected from a poorly accessible part of the western half of the map area that had not been previously sampled.

The objectives of this till sampling project were: 1) to aid in assessing the mineral resource potential of the Coldstream map area; and 2) to determine the direction (or directions) of glacial dispersal in the area. Samples were collected based on the standard 2 km sample grid, comparable to that used for the adjacent Millville (NTS 21 J/03) and Woodstock (NTS 21 J/04) map areas. A total of 121 samples were collected from 115 sites.

GEOCHEMISTRY LABORATORY (Toon Pronk, Rex Boldon, Serge Allard) During the summer of 2001 surficial mapping and till sampling were carried out in the Rollingdam (NTS 21G/07) area (Figure 3: 15). The area covers the eastern extension of the Clarence Stream gold belt. Toon Pronk (as the scientific authority and intermediary between the Geological Survey of Canada and Federal Department of Supply and Services, and the local contractor) directed a National Geochemical Reconnaissance stream-sediment and water geochemistry survey in the Juniper area of central New Brunswick (NTS 21 J/11; Figure 3: 16). Toon Pronk and Rex Boldon directed and did quality control for the survey. Publication is expected in 2002.

Rex Boldon provided field and laboratory assistance for several surficial mapping projects. He prepared all collected till samples for analysis and carried out grain-size analyses on till samples from surficial mapping in northwestern New Brunswick (NATMAP; Figure 3: 3), and the Coldstream map area (Figure 3: 14).

INDUSTRIAL MINERALS (Tim C. Webb and D.V. Venugopal) In 2001, the industrial minerals section of the Geological Surveys Branch continued with geotechnical activities related to gypsum, titanium, silica and natural stone resources. In addition, the section dealt with an assortment of issues pertaining to the development of New Brunswick's nonmetallic mineral resources.

The re-assessment of New Brunswick's gypsum and anhydrite resources was completed resulting in publishing several detailed reports and accompanying maps. All seven deposits, mostly from southeastern New Brunswick, contained profiles regarding their geology and development history. An attempt was made to re-evaluate each deposit based on compiled drilling, ore grade and tonnage, and the application of a geologic model to assist in the recognition of several local exploration and development alternatives. The establishment of exploration models for these deposits has led to an improved understanding of the various geologic factors controlling the distribution of their gypsum and anhydrite resources and has resulted in the recognition of several areas with exploration potential for high-quality gypsum.

Detailed characterization of five genetic types of silica occurring in New Brunswick (i.e., veins, quartzite, arenaceous clastics, siliceous gravel, etc.) continued with some follow-up work proposed for 2002. This work has revealed several new occurrences of arenaceous sandstone in southern New Brunswick.

A project was initiated to identify potential marketable sources of cobbles and boulders, and decorative aggregate in selected map areas on Crown land throughout New Brunswick. These natural stone resources are frequently overlooked from a development prospective and yet, appear capable of providing a host of high-value products to the landscaping, horticultural and related construction markets. The market potential throughout North America (the northeast United States in particular) for this type of material is undeniable. Given New Brunswick's diverse geology and favorable geographic location to a large U.S. market, there is a reasonable expectation that such a resource could support one or several small- to medium-sized businesses in the region. It is also interesting to point out that these resources generally require minimal capital investment in expensive processing and related equipment and offer a real opportunity for expanding and diversifying the Province's mineral resource sector.

Detailed studies undertaken to assess the potential for titanium deposits in New Brunswick were completed in 2001. Most of this work was focused on what appears to be a favorable gabbro–anorthosite sequence of rocks, host to significant magnetite–ilmenite–apatite mineralization in the Stewarton area, 25 km west of Sussex in south-central New Brunswick (Figure 3: 17). A detailed 1:25 000 scale geological map of the area was finalized. Other completed work included detailed petrography, geophysical modeling based on magnetic and gravity data, rock geochemistry for more than 30 samples, microprobe work on selected samples and a literature search into the nature of titanium deposits in general. This work is being assembled into a final report on the area.

COMMITTEES Les Fyffe co-ordinated the Provincial contribution to the joint Fedreal–Provincial Targeted Geoscience Initiative project on gold mineralization in southern New Brunswick. He was also a member of the Atlantic Geoscience Society committee that prepared a book (The Last Billion Years) on the geology of the Maritimes. The book is now in its third printing having sold over 5000 copies.

Toon Pronk is the New Brunswick representative on the Canadian Geoscience Education Network.

CONFERENCES/WORKSHOPS/FIELD WORKSHOPS Les Fyffe and Richard Grant led an NEIGC field trip to Grand Manan Island in the fall of 2001. A field trip was conducted in the Meductic–Poplar Mountain area of west-central New Brunswick in conjunction with the joint Fedreal–Provincial Targeted Geoscience Initiative project on gold mineralization in southern New Brunswick.

Malcolm McLeod attended the Annual International Convention and Trade Exhibition of the Prospectors and Developers Association of Canada that were held in Toronto during March. Malcolm McLeod and Susan Johnson attended and participated in the Atlantic Geoscience Society Colloquium and Annual General Meeting in February held in Moncton. Susan Johnson presented a paper on aspects of the Neoproterozoic to Cambrian rocks in southern New Brunswick. Malcolm McLeod, Les Fyffe and Susan Johnson, in cooperation with Acadia University personnel, continued with joint research on the Avalon Zone of southern New Brunswick and correlatives in Maine. Several field trips were organized and attended to that end.

In February Clint St. Peter attended the Atlantic Geoscience Society Colloquium and Annual Meeting in Moncton where he chaired a special session on "Onshore and Offshore Oil and Natural Gas Exploration and Related Research". In April, Clint St. Peter, Ron Phillips and John Griggs attended the Canadian Association of Petroleum Landmen's prospect exchange in Calgary where they serviced New Brunswick's booth displaying current oil and natural gas activities and maps showing the sedimentary basins in the province with petroleum potential. While in Alberta talks on revisions to New Brunswick's oil and gas legislation were held with officials at the Alberta Energy and Utilities Board (Calgary) and the Department of Energy (Edmonton). In February, Clint St. Peter attended and successfully passed a Petroleum Industry Training Service (PITS) short course on First Line Supervisor's Blowout Prevention, which was given in Moncton. In October he also participated in a two-day course on 3-D Seismic Interpretation presented by Dr. Bruce Hart in Halifax at the Canadian Institute of Mining, Metallurgy & Petroleum (Petroleum Society) OTANS Conference. In June, Clint St. Peter provided a one-day geological field trip to facilitators at Fundy National Park in Alma. Park visitors are apparently showing a greater interest in geology and coastal processes. A field trip was offered in the Sussex and Millstream area to geologists of Corridor Resources Inc. There, features of interest were visited that pertained to the company's assessment of an oil and gas play that the company later drilled.

Tim Webb and D.V. Venugopal (Venu) presented papers and posters at the Division's Review of Activities. Tim's paper entitled "Industrial Minerals, Rock in New Brunswick" briefly reviewed the year's activities related to development of the Province's industrial minerals industry and reported on the branch's recent field activities. Venu presented a poster of his work regarding titanium mineralization in the Stewarton and Lower Coverdale areas of southern New Brunswick.

Toon Pronk presented a poster on the till geochemistry survey in the McDougall Lake area at the annual Review of Activities.

OTHER ACTIVITIES Les Fyffe and Sue Johnson have produced a digital lexicon of New Brunswick stratigraphy to accompany the 1:500 000 scale digital geology map of New Brunswick.

Throughout the year, Toon Pronk visited classrooms when teachers made requests through the Geological Surveys Branch. A total of 11 classes, from grades K to 6 (and one grade 12 Geography class), mostly one but sometimes two classes at a time, in seven different schools (approximately 320 students) were visited. Mostly grade 5 and 6 students learned about rocks and minerals, volcanoes, earthquakes, ice ages, soils, erosion, mining, and earth science in general. The presentation is adapted to fit the "Changes in the Land" earth science module in the science curriculum. It is increasingly difficult to fit these visits into our section's activities. Ron

Shaw, Serge Allard, and Toon Pronk led a half-day field trip in the Harvey area for two grade 7 classes.

PUBLICATIONS A paper on the stratigraphy and geochemistry of the Meductic Group near Woodstock, authored by Les Fyffe, has been submitted to *Atlantic Geology*. A paper on the chemostratigraphy of drill core from the Meductic Group, co-authored by Sean McClenaghan, Dave Lentz , and Les Fyffe, has been submitted to *Mining and Exploration Geology*. A paper presenting the results of radiometric dating of the Gayton granite and equivalents in the Lower Coverdale complex in southeastern New Brunswick, co-authored by Sandra Barr, Chris White, and Mike Hamilton, has been submitted to "Current Research 2001."

A field trip guide was prepared and field trip offered by Clint St. Peter on the Petroleum Geology in the Carboniferous of Southeastern New Brunswick. The guide was published in the Guidebook to Field Trips in New Brunswick and Western Maine as a product of the 93rd Annual Meeting, New England Intercollegiate Geological Conference in Fredericton, September, 2001.

In 2000, Allen Seaman updated the "Annotated bibliography of surficial geology (regolith) mapping, and investigations of glacial geology in New Brunswick (including till and soil geochemistry studies)," which was released in 2001 as Open File 2001-1. A preliminary report on till geochemistry investigations in the west half of the Coldstream (NTS 21 J/06) map area was released as Open File 2001-2. A paper on "The Cloverdale As–Sb dispersal train, and other till geochemical anomalies in the west half of the Coldstream (NTS 21 J/06) map area, Carleton and York counties, New Brunswick" was published in the Division's "Current Research 2000" volume (Mineral Resource Report 2001-4).

An article entitled "Industrial rock and mineral development and opportunities in New Brunswick" was published in a Canadian Institute of Mining, Metallurgy and Petroleum special volume on "Industrial Minerals in Canada." The following is an excerpt from the paper's abstract:

> "New Brunswick's varied geology is reflected not only by the diversity of industrial rock and mineral resources presently under development but also in several promising exploration and potential development opportunities. The Province is home to several industrial rock and mineral processing facilities, each with established technologies ensuring high-quality products and each with sufficient flexibility to supply customized products for various specialized niche markets. With the imminent availability of natural gas to parts of the Province, the prospects for additional value-added processing and re-examination of known, yet presently undeveloped deposits appear excellent. These variables coupled with New Brunswick's advantageous geographical location, highlighting tidewater access to global markets and within one day's trucking distance to a regional market of several million people, guarantee prompt delivery of high-quality products at competitive prices."

Exploration Support Services

The Exploration Support Services Section consists of the Manager Paul Rennick, Diane Richard (GIS Technician), Ken Mersereau (GIS Technician), Shasta Merlini (Exploration Support Programs), and Barbara Carroll (Geoscience Editor). This Section is responsible for the New Brunswick Mineral Occurrence Database; Drill Core Management and Exploration Support Programs; Computerization of Geoscience Data and GIS-related Projects; and Geoscientific Editorial Services.

NEW BRUNSWICK MINERAL OCCURRENCE DATABASE (Shasta Merlini) The New Brunswick Mineral Occurrence Database includes descriptions of metallic mineral occurrences in New Brunswick that range in size from small showings to operating mines. The data recorded include descriptions of the geological setting, geographic location, prospecting history, geochemical and geophysical surveys, trenches and drill holes, assays, and published reserves. Sources of information are listed and include the Division's published geological reports, maps, and unpublished file material, industry assessment reports, Geological Survey of Canada publications, scientific journal articles, and university theses. All coordinates are in the New Brunswick Stereographic Projection, based on the North American Datum 1983. The New Brunswick Mineral Occurrence Database is updated on an ongoing basis for the entire province.

The database no longer uses dBASE file format. It is now available in Microsoft Access. There are currently 1419 mineral occurrences, with text files available for the majority. A selected portion of the data is now available on the Department's website (http://www1.gnb.ca/0078/GeoscienceDatabase/index.htm).

DRILL-CORE MANAGEMENT AND EXPLORATION SUPPORT SERVICES (Shasta Merlini) The Geological Surveys Branch maintains drill-core storage facilities in Fredericton, Bathurst, and Sussex. The Bathurst facility, located approximately 30 km north of Bathurst at Madran, was built in the mid-1970s with funding from the Canada–New Brunswick General Development Agreement. The Sussex facility, located behind the Regional Office at Picadilly, was built in the 1980s from funding under the Canada–New Brunswick Mineral Development Agreement. The Fredericton core-storage facility was built as part of the Hugh John Flemming Forestry Centre in the late 1980s. All facilities are equipped with well lit viewing rooms and core saws. The facilities are well used by industry and government geologists.

A selected portion of the drill-core database is now available on the Department's website (http://www1.gnb.ca/0078/GeoscienceDatabase/index.htm).

In 2001, the Geological Surveys Branch received core from BP Minerals Ltd., Noranda Inc., Lafarge Canada Inc., Cobrun Mining Corp., and Columbia Natural Resources Canada, Ltd.

PROVINCIAL EXPLORATION AND DEVELOPMENT INITIATIVES The Department of Natural Resources and Energy introduced the New Brunswick Junior Mining Assistance Program and the New Brunswick Comprehensive Prospector Development Program in fiscal year 2001/2002 to stimulate mineral exploration. These are three-year programs with an annual budget of $600 000 ($350 000 for NBJMAP and $250 000 for NBPDP). The funding is provided by the Regional Development Corporation.

The New Brunswick Junior Mining Assistance Program (NBJMAP) The first junior mining assistance program, the New Brunswick Exploration Assistance Program (NBEAP), was introduced in November, 1994 and was funded by the Canada–New Brunswick Cooperation Agreement on Economic Diversification. In 1998, NBEAP received funding from the Provincial government. This program had the same objectives and guidelines as for the previous federal–provincial program. In 2000, NBEAP was funded completely by the New Brunswick Department of Natural Resources and Energy. The New Brunswick Junior Mining Assistance Program (NBJMAP) was initiated in 2001. The main objective of the program is to provide financial assistance to junior mining companies in order to increase the probability of finding economic reserves of mineral resources in New Brunswick. This program will provide up to 50% of the project cost to a maximum of $40 000 per company per year. The minimum amount available per project is $10 000. The remaining costs of the project will be borne by the applicant, either in cash or "in-kind" work. The NBJMAP Review Committee, chaired by Shasta Merlini and comprising Malcolm McLeod, Brian Roulston and Steven McCutcheon, reviewed 14 applications and recommended that 11 applicants receive assistance for a total of $350 000.

Comprehensive Prospector Development Program (NBPDP) This program includes: the New Brunswick Prospector Assistance Program ($170 000), Prospector Training ($50 000), Prospector Rewards (up to $10 000), and Prospector Promotion ($20 000).

The earliest prospector assistance program, the Mineral Exploration Stimulation Program, was introduced in 1988 by the Geological Surveys Branch. The New Brunswick Prospector Assistance Program (NBPAP) was initiated in 2001, with the same objectives and guidelines as the previous program. Successful applicants to the program are awarded grants to help defray their prospecting costs. Eligible expenses for the program are analyses, mileage, trenching, geophysics, and geological consulting. Prospectors are not allowed to charge capital expenses or wages to the program. The recipient must provide the Program Coordinator with a sample location map, results of analyses, and receipts documenting expenses in order to receive the final instalment of the grant. In 2001, applications were reviewed by a committee chaired by Shasta Merlini. Members of the NBPAP Review Committee were Malcolm McLeod, Steven McCutcheon, and Gary Woods. They reviewed 48 applications for funding and approved 46. The NBPAP budget was $170 000 in 2001 and the maximum grant was $10 000.

Prospector Training funds were provided for two activities. In September, a large display prepared by the Division accompanied the Great Canadian Mine Show that made stops at Sussex, Fredericton, Bathurst and Moncton. The Division display consisted of a number of posters describing prospecting and exploration in the Province, and a collection of New Brunswick rock and mineral hand specimens. Beginning in October, introductory prospecting courses were held in St-Quentin, Fredericton, Miramichi, and Moncton. The instructors were hired under contract.

Prospector Rewards funding in the form of a cash reward was provided to Rufus Smith, a long-time prospector, for discovering a new copper–cobalt deposit in northern New Brunswick in 2001. He was also chosen as the New Brunswick Prospectors and Developers Association's "Prospector of the Year."

Prospector Promotion funding was provided to assist nine prospectors in attending either the Annual Cordilleran Exploration Roundup in Vancouver or the Annual International Convention and Trade Exhibition of the Prospectors and Developers Association of Canada in Toronto so that they could promote their exploration properties to both junior and major mining companies. Some of the funding was used to help with preparation of poster displays. The prospectors receiving assistance were Raymond Thorn, Frank Ross, Delbert Johnson, Peter Fenety, Ken Whaley, Bill Gardiner, Dave Stevens, Rufus Smith, and Emilio Doiron.

COMPUTERIZATION OF GEOSCIENCE DATA AND GIS-RELATED PROJECTS (M.P. Rennick, K. Mersereau and D. Richard) Staff continued to update databases using the Geoscience Information System (GSIS). The following 12 GSIS-related projects were conducted during the year.

Base Maps (M.P. Rennick and D. Richard) Customized 1:20 000 and 1:50 000 scale base maps were provided for the Southwestern New Brunswick Airborne Geophysical Survey and for provincial field geologists working other mapping projects, as well as for federal and industry partnership programs. These maps were produced by combining Service New Brunswick 1:10 000 scale bases and contours from the Digital Elevation Model and, where requested, adding updated road network information obtained from Timber Management Branch. These maps contain selected features of the original Service New Brunswick base.

Geochemical Surveys (M.P. Rennick and K. Mersereau) Provided digital files of hydrographic and topographic base map layers, and digitized sample locations with sample results, as requested, for public distribution. The GIS Section staff have been customizing these files upon request.

Bedrock Geology Maps (K. Mersereau and D. Richard) Maps for the Restigouche, Kingston–New River and other bedrock-related projects were digitized and hard copies were produced for public distribution. A few bedrock geology maps completed before 1990 were also digitized depending upon the priority and availability of digitization resources. The first priority is to digitize current field projects as requested. The production of the French edition of the new digital 1:500 000 scale bedrock geology map of New Brunswick (NR-1, Édition de 2000) was completed and released. Diane Richard has started compiling digitally a Lexicon of Stratigraphy in New Brunswick, that will reflect the bedrock geology of the recently revised NR-1 map.

Surficial Geology Maps (K. Mersereau) The surficial geology maps for southern and central New Brunswick projects (Toon Pronk, Al Seaman) were digitized for public distribution.

Industrial Mineral Maps (K. Mersereau) All maps from the Aggregate Resource Atlas, consisting of geology and aggregate resources, are being digitized as priorities allow and are available for public distribution.

Aggregate Inventory Maps (K. Mersereau) Custom 1:12 500 scale maps are being created for the sand and gravel permit sites.

Digital Mineral Claim Management System Andy LeBlanc has continued to update the mineral claim maps using the Digital Claim Management System. Standard 1:50 000 and 1:150 000 scale hard-copy mineral claim maps are produced in Fredericton and Bathurst for public distribution and internal use. Paul Rennick created a 1:500 000 scale Claim map of New Brunswick for presentation at the Review of Activities and for distribution electronically on the web site.

Assessment Work Location Maps for New Brunswick These 1:50 000 maps continue to be updated by Ken Mersereau.

Geoscience Publication Indexing System (GPIS) During the initial probing study of the Integrated Mineral Resource Management System (IMRMS), the GPIS was identified as the first priority. Developed in 1996, the GPIS is designed to provide users with a means for quickly searching a large database containing publication information. Included is geoscience information on New Brunswick published by the Geological Survey of Canada (maps and reports), by the mineral industry (mineral exploration reports of work), and by scientific journals (papers). Copies of all publications are held by the Minerals and Energy Division. Queries may include map scales, repository information, authors, subject key words, and prices.

By the summer of 1996, the programming was completed and existing data were transferred into the system. Each of the three main databases (list of publications, geoscan index, and bibliography) are being updated by Carol McNeill-Dobbelsteyn. Rob Stewart has created custom programming for electronic access to this database.

Geoscience Databases The standard structure of a number of data collections were modified to better accommodate storage and access. Modification of the geochemistry database will accommodate the results of geochemical analysis performed on drill core, and stream silt, till, and rock samples. This will maximize usability of geochemical data within the Minerals and Energy Division and improve the mechanism for exporting this data to industry clients.

Similar to the geochemistry database, modifications were made to the Borehole Catalogue (Lori Fellows), the Seismic Database, Mineral Occurrence Database and the Spore Database (Rob Stewart).

Mineral Claim Tracking System This system, which has been utilizing dBase III to manage mineral-claims-related information, has been upgraded to a relational INGRES database (RASMIN), by Phil Butland of Information Services and Systems. Based on the scope and objectives of the IMRMS, the Mineral Resource Allocation System will manage all resource rights, including mineral claims, leases and agreements. The system is now being used, with the need to create additional custom querying and reporting utilities. A utility to incorporate a graphical interface to the digital Mineral Claim Maps is to be developed by Information Services and Systems.

Electronic Access (M.P. Rennick, R. Stewart) The project entailed the programming of custom sets of query pages that will allow access, through the internet, to five of the Geological Surveys Branch Microsoft Access databases. The GPIS, Mineral Occurrence Database, Borehole Catalogue, the Mineral Claims and the Drill Core Storage databases were all set up with customized WEB-based pages that initiate database queries, that would return the results in HTML code, to the client. These pages, with custom query menus, were added to the Province of New Brunswick Internet site in November (http://www1.gnb.ca/0078/GeoscienceDatabase/index.htm).

GEOSCIENTIFIC EDITORIAL SERVICES The Geoscience Editor for Minerals and Energy Division publications, Barbara M.W. Carroll, is responsible for editing geoscience maps and editing and formatting geoscience reports submitted by Division staff for publication as Mineral Resource Reports or Information Circulars. The third category, Open File, is published as received. A system of scientific/technical review has been put into place that ensures that peers review manuscripts before they are submitted for publication. Annually prepared publications include : "Preliminary Review of New Brunswick's Mineral Industry," "Rétrospective préliminaire de l'industrie au Nouveau-Brunswick," "New Brunswick's Mineral Industry," "Current Research," and "Abstracts/Résumés." In 2001, 21 reports and 66 maps were edited and/or prepared for publication.

Barbara Carroll assisted with the preparation of a set of four posters (English and French) that were displayed at the same venues as the Great Canadian Mine Show in September. These posters depicted propecting and exploration information related to the Province's gold, base metals (Bathurst Mining Camp), oil and natural gas, and potash. The Great Canadian Mine Show coincided with Mining Week.

CONFERENCES / WORKSHOPS Shasta Merlini and Paul Rennick presented poster displays at the Review of Activities. Paul Rennick attended a Metadata Catalog workshop held in Ottawa, and the Digital Earth conference in Fredericton. Paul Rennick organized a one-day workshop on Digital Data and Electronic Access at the Review of Activities. Shasta Merlini organized several prospecting courses around the province. Barbara Carroll attended the Review of Activities.

COMMITTEES Paul Rennick was on the Georeferenced Civic Address Data Base working group, the Information Technology Advisory Committee, and the CGKN Metadata Catalog working group. Shasta Merlini was the Review Committee coordinator of the New Brunswick Prospector Assistance Program and the New Brunswick Junior Mining Assistance Program. Barbara Carroll is a member of the Department of Natural Resources and Energy Library Committee.

Mines Branch

Sam McEwan, Director

The Mines Branch is responsible for the allocation of rights and development of New Brunswick's mineral, energy, and Crown peat and aggregate resources. These natural resources are administered under the following legislation and respective regulations: the *Mining Act*, *Quarriable Substances Act*, *Oil and Natural Gas Act*, *Bituminous Shale Act* and the *Ownership of Minerals Act*. The Branch also has responsibility for the *Underground Storage Act* and the *Pipeline Act*. The Branch provides a variety of geoscientific, technical, and support services to the clients and staff of the Minerals and Energy Division. The Branch is composed of four sectors: Resource Rights Allocation, Resource Approvals, Mineral Information Services, and Peat (Figure 1d).

The Branch is primarily located in Fredericton; however, two staff positions are located in the Bathurst Regional Office. The principal activities of the Branch include: (1) the registration and maintenance of records for mineral claims staked in the Province; (2) the review and approval of applications for mineral, aggregate, energy and peat resource developments and pipelines (these include mines, pits and quarries, peat extraction, oil and gas exploration and production facilities, pipelines, underground storage and bituminous shale developments); (3) the monitoring of resource operations to ensure optimal extraction and use of the resource as well as compliance with approved feasibility studies and reclamation plans; and (4) the management of a program intended for the promotion of adding value to the resources under its administration. For the 2000–2001 fiscal year, the Branch had an A-base budget of $1 228 700 and 15.0 full-time equivalent positions. Actual expenditures are given in Table 1.

COMMITTEES Sam McEwan is a member of the Intergovernmental Working Group (IGWG) Directors of Mines sub-committee. This committee has been created to facilitate the exchange of information between those Federal, Provincial and Territorial representatives directly responsible for legislation as it relates to the extraction of minerals in their respective jurisdictions. The purpose of the Director of Mines sub-committee is to provide a forum for the communication of information between Canadian mining jurisdictions, which will facilitate the identification of common issues and the development of solutions to these collective problems. The ultimate objective is to provide assistance to Canadian mining authorities, which will ensure the optimal, efficient extraction of Canada's mineral resource, while at the same time protecting both the Canadian social and natural environments. Mr. McEwan attended two meetings of this committee, both in Quebec City. He is a member of the interdepartmental Standing Committee on Mining and the Environment, which met regularly during the year to address mining and environment issues.

CONFERENCES/WORKSHOPS In June 2001, Mr. McEwan attended a workshop in Winnipeg on Abandoned and Orphaned Mines, and in September attended the Mines Ministers' Conference in Quebec City. During that same period he also attended a workshop on gold.

Table 2. New Brunswick Mineral Resource Allocation and Exploration Statistics, 2000 and 2001

Mineral Resource Allocation (total in effect at year's end unless specified for the year)	2000		2001	
	Number	Hectares	Number	Hectares
Mining Act				
Prospecting Licences Issued (year)	56	---	61	---
Claims Recorded (year)	3 084	49 344	2 232	35 712
Claims Expired (year)	2 905	46 480	3 288	52 608
Claims in Effect	15 030	240 480	14 251	228 016
Coal Agreements	4	58 917.6	4	58 917.6
Potash Exploration Agreements	0	0	0	0
Potash Leases	2	20 024.2	2	20 024.2
Mining Leases	17	12 528	17	12 691
Total Agreements and Leases (above)	---	91 469.8	---	91 632.8
Total in Effect	---	331 949.8	---	319 648.8
Oil and Natural Gas Act				
Licences to Search	26	592 091.5	32	659 051.4
Leases	6	7 890.1	8	51 358.7
Bituminous Shale Act				
Licences to Search	0	0	1	26 833
Development Permits	0	0	0	0
Leases	0	0	0	0
Underground Storage Act				
Storage Exploration Licences	7	28 791	7	28 791
Storage Licences	0	0	0	0
Construction Permits	0	0	0	0
Quarriable Substances Act				
Quarry Permits	256	---	248	---
Quarry Leases	16	608.155	16	608.155
Peat Exploration Licences	4	1955	3	1002
Peat Leases	33	13 303.6	36	14 433
Peat Options	14	4 604	11	3 580

Exploration Summary	2000		2001	
	Work Reported	Value	Work Reported	Value
Mining Act				
Reports of Work (RW)	91 reports filed	$8 193 207.70	96 reports filed	$6 076 250.85
Drilling Reported in RW	224 holes (17 198 m)	$1 417 775.71	247 holes (60 131 m)	$4 333 701.06
Potash Exploration	---	0	---	0
Oil and Natural Gas Act	11 wells (21 900 m*)	$10 000 000.00	8 wells (21 200 m*)	$23 169 162.00†
Bituminous Shale Act	---	0	---	0
Underground Storage Act	---	0	---	0

n/a not available
* licenced depth
† value at time of printing (final cost on some wells not available)

February , 2002

Peat

The Peat Resources Geologist, Jacques Thibault, is responsible for managing the peat resources of the Province and for monitoring activities on 35 industrial peat leases. The peat resources geologist coordinates the peat lease application process. He also compiles statistics on the sector and provides expert advice to government, industry and the public in general.

The Province of New Brunswick is the principal peat producing area of Canada with about 35% of the national output. In New Brunswick, peat is defined as a quarriable substance and belongs to the landowner. About 70% of potentially commercial peatlands occur on Crown lands, which explains why the provincial government plays a major role in the administration of that resource. The current focus of the province's peat development strategy is on resource allocation, conservation of representative natural peatlands, and restoration of abandoned commercial peat operations.

In November 2001, the Minister of Natural Resources and Energy, Hon. Jeannot Volpé, announced the new provincial policy on peat mining. The policy introduces measures to encourage and stimulate the development of secondary processing of the peat resources. The policy is available at the Department's website at the following address: http://www.gnb.ca/0078/reports/index-e.asp.

CONFERENCES / WORKSHOPS In February, Jacques Thibault took part in the 8th Annual Workshop on activities of the Peatland Ecology Research Group (PERG) at Laval University in Québec City. In May, Jacques returned to Laval University to follow an intensive 11-day course in boreal peatland ecology. In October, he participated in the 4th Workshop on the transfer of technology regarding peatland restoration. The workshop, organized by PERG, was held in Rivière-du-Loup (Québec). In November, Jacques gave a short course on the many facets of peat and peatlands at the Collège communautaire du Nouveau-Brunswick, Grand-Sault, New Brunswick.

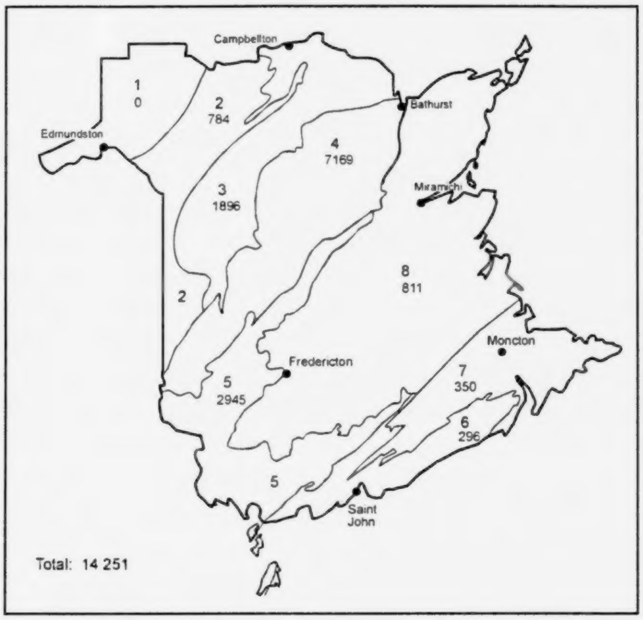
COMMITTEES Jacques Thibault is a member of the interdepartmental committee formed to review all provincial policies concerning the peat industry.

Resource Rights Allocation

In 2001, Resource Rights Allocation staff (Figure 1d) consisted of Ron Shaw (Manager, Recorder), and Ron Phillips (Energy Resource Rights Administration–oil, natural gas, bituminous shale and underground storage). Daine Bergeron assumed the duties as Deputy Recorder

Reports of work, submitted to the Resource Rights Allocation Section in accordance with the *Mining Act, Oil and Natural Gas Act, Bituminous Shale Act,* and *Underground Storage Act,* are checked for compliance with the relevant regulations and work credits are applied to appropriate properties. Upon acceptance, the reports are processed and forwarded to the Mineral Information Services staff for microfilming, and storage. Mineral resource allocation and exploration statistics are presented in Table 2 and Figure 4.

LEGISLATION An undertaking to amend the land tenure system of the *Oil and Natural Gas Act* resulted in an *Act to Amend the Oil and Natural Gas Act* and amendments to *the Survey System Regulation* and the *Licence to Search and Lease Regulation* in October 2001. A workable and appropriate land tenure



Geological zones*:
1. Edmundston
2. Kedgwick
3. Tobique–Chaleur; Elmtree
4. Miramichi North (Bathurst Mining Camp); Miramichi South
5. Fredericton; Passamaquoddy
6. Saint John; Fundy Basin
7. Moncton Subbasin (Maritimes Basin)
8. Carboniferous Cover (Maritimes Basin)

* This is a simplification of the recently revised terrane map of New Brunswick.

Figure 4. Total number of claims in effect, by geological zone, in 2001.

system that encourages hydrocarbon exploration and development while ensuring that there is fair compensation to both the Crown and industry is the result.

The amendment to the Survey System Regulation provides four-digit numbers, called grid index numbers (GIN), for easier reference to grid areas, which were previously identified by the latitude and longitude of the northeast corner of the grid. Tenure description for oil and natural gas, bituminous shale and underground storage rights (see section on Hydrocarbons and Underground Storage in Chapter 2) will make reference to GIN in square brackets following the agreement number under the "Location" heading.

COMMITTEES Ron Shaw attended the annual Provincial/Territorial Mining Rights Committee meeting in Halifax in September of 2001. The committee is an informal forum established to share information regarding mining rights administration across Canada. In sharing such information, it is hoped that each jurisdiction would, over time, develop similar methods for dealing with similar mining rights situations.

Ron Phillips is a member of the Intergovernmental Petroleum Tenure Committee (IPTC).

CONFERENCES Ron Phillips attended the Prospect Exchange in April, sponsored by the Canadian Association of Petroleum Landmen in Calgary. In September, he attended the Canadian Association of Petroleum Landmen (CAPL) Conference and the IPTC meeting in Vancouver in September 2001. Also, he attended the Ontario Petroleum Institute annual conference and trade show in London, Ontario in November.

In April–May of 2001, Ron Shaw attended the Annual General Meetiing and Council Meeting of the Canadian Institute of Mining, Metallurgy and Petroleum in Quebec City.

Resource Approvals

MANAGER, RESOURCE APPROVALS (John Griggs) The Manager, Resource Approvals, is responsible for work of both a specific and general nature relating to mining, quarrying, pipelines and hydrocarbons in New Brunswick. Responsibilities include the monitoring of mining activities; permitting of oil and gas exploration and production; permitting of pits and quarries; compilation of technical and mining statistics; administration of the *Mining Act, Quarriable Substances Act, Pipe Line Act* and *the General Regulation* under the *Oil and Natural Gas Act*; review and evaluation of feasibility reports and annual mine plans; and administration of projects funded under the provincial Value-added Mineral Processing (VAMP) Program. In addition to these specific tasks, the Manager, Resource Approvals, liaises with the federal government and other provincial governments on matters related to the mining industry.

During 2001, the Manager, Resource Approvals, monitored mine-related activities and reviewed a number of mine plans received in compliance with the *Mining Act* (Section 25, Regulation 8698). He also reviewed several issues relating to pits and quarries, as well as applications relating to exploration for oil and natural gas. He was involved in continuing efforts to update Provincial legislation on hydrocarbons. Numerous submissions under the Environmental Impact Assessment Regulation of the *Clean Environment Act* were also reviewed.

Issues requiring the attention of the Manager, Resource Approvals, included a review of the status of Breakwater's Caribou mine (see Figure 9 in Chapter 3 for mine locations), which shut down in August 1998 in response to continuing metallurgical problems and depressed metal prices. Potash Corporation of Saskatchewan–New Brunswick Division (PCS) continued compacting fine-grained material from Saskatchewan at the former Potacan facilities, which were acquired by PCS after flooding caused the closure of Potacan's Cassidy Lake mine in 1997. PCS reports continued progress at its Penobsquis underground mine in controlling a brine inflow, first identified in 1998. Monitoring continued at NovaGold Resources Inc.'s Murray Brook minesite, reclaimed in 2000. There was no change in the status of ADEX's Mount Pleasant property, which remained under care and maintenance as the company continued discussions with potential investors. Noranda's Brunswick mine successfully rehabilitated one of its main production blocks which had been made temporarily inaccessible as a result of severe seismic events. Reclamation activities continue at Noranda's Heath Steele mine (Figure 3: 18), which closed permanently in October 1999 because of depletion of reserves.

HYDROCARBONS ENGINEERING The position of Hydrocarbons Engineer is currently open. The incumbent is responsible for the review and approval of new pipelines, changes to existing pipelines, review and permitting of drilling operations, and generally ensuring the compliance of pipeline and hydrocarbon drilling operations with the legislation.

Pipelines Maintenance and repair on the Lorneville pipeline (see Figure 9 in Chapter 3) continued under an established work plan. The pipeline operated normally in 2001, with one minor leak that was promptly repaired. In November an in-line inspection was conducted with a magnetic flux leakage tool ("smart pig"). The results of the test indicated the effectiveness of maintenance actions. An independent reviewer made numerous recommendations for future maintenance in order to ensure the long-term integrity of the pipeline.

In 2001, NB Power announced plans to convert the Coleson Cove thermal generating station see Figure 9 in Chapter 3) to an Orimulsion-fuelled facility. The proposal continues to be reviewed by the responsible agencies, including the Public Utilities Board, the Department of Environment and Local Government, and the Department of Natural Resources and Energy.

Drilling The major companies conducting exploration during 2001 have been Columbia Natural Resources Canada, Ltd. (Columbia), Corridor Resources Inc. (Corridor), Potash Corporation of Saskatchewan Inc. (PCS) and Corridor's farm-out partners Globex Resources Ltd (Globex) and EOG Resources Canada Inc. (EOG). Exploration expenditures from January to December totalled $25 000 000. During 2001, Columbia completed production testing on four oil wells, two of which are expected soon to be placed on permanent production. Columbia also drilled three other wells in the Moncton area, two of which were plugged and abandoned, while activity on the remaining well was suspended. Corridor and joint venture partner PCS drilled three step-out wells as a follow-up to the 2000 discovery well. Later in the year, Corridor made formal application for regulatory approval to pipe natural gas from the first two McCully wells to PCS's nearby potash mine. Following a seismic survey on three licence areas west and north-west of Sussex, Corridor and Globex drilled an exploration well, which proved dry and was abandoned. EOG is currently drilling its third well in the McCully field. Under the second phase of the agreement with Corridor, EOG is required to drill an additional nine wells or otherwise undertake $50 000 000 in exploration on the farm-in lands to win a 50% interest in Corridor's rights.

RECLAMATION ENGINEERING (Cory Neumann) The Reclamation Engineer is responsible for departmental coordination of the reviews of mine reclamation and closure plans, annual reclamation progress inspections, and coordination of the provincial mine approval process as it deals with environmental issues, exploration, and mine site audits. In addition, the reclamation engineer liaises with the federal and provincial governments and industry on matters related to mining and the environment.

Issues requiring the attention of the reclamation engineer during 2001 were the continuing reclamation of the Heath Steele mine (Figure 3: 18), monitoring of the reclaimed Murray Brook mine, water treatment at the idle Mount Pleasant mine, approval and opening of the Plaster Rock Gypsum and Limestone properties, and ongoing reclamation at NB Coal Limited operations (see Figure 9 in Chapter 3 for location of mines). Requests for closure of several NB Coal mine sites were reviewed and several inspections conducted. A number of environmental and reclamation issues related to Noranda's Brunswick No.12 mine and CanZinco's Caribou mine were reviewed by the Standing Committee on Mining and Environment. APOCAN's Lake George antimony property (see Figure 9 in Chapter 3 for location of mines) remained inactive during 2001.

Most mining companies have maintained their reclamation on disturbed land in accordance with their approved schedule. Reclamation and remediation progress is ongoing at several properties, with some moving to final closure.

QUARRIABLE SUBSTANCES ADMINISTRATION (Mitchell O'Donnell) Quarriable substances on Crown lands in New Brunswick are administered under the *Quarriable Substances Act*. The Quarriable Substances Administrator controls, through the issuance of permits and leases, extraction operations on Crown lands and on that area of the shoreline that lies within 300 m above and 300 m below the mean high water mark.

In 2001, 1 232 852 t of quarriable substances were extracted from pits and quarries on Crown land in New Brunswick (2 300 989 t in 2000). Revenue from royalties amounted to $308 213. Quarry lease land rentals amounted to $26 400 and application fees amounted to $2480.

This significant decrease in overall tonnages in 2001 from the previous year was due mainly to the inactivity at quarry sites located in the Coles Island area. Most of these quarry sites were opened in 2000 mainly for the construction of that portion of the Trans-Canada Highway between Youngs Cove Road and Millstream. This project is now finished and these quarry sites have been rehabilitated.

Major extraction activity did occur, however, from pit and quarries located in the Bois Gagnon, Shaddick Lake, Blue Mountain, Blagdon, Magundy and Belledune areas. Overall there was approximately 825 000 tonnes of material removed from these permitted and leased sites for highway and infrastructure needs.

Forestry companies continued with their forest road construction and maintenance operations. Approximately 169 000 t of material were removed from various pit and quarry sites located on Crown Land across the Province for forest road projects.

Approximately 115 000 tonnes of material were removed from five newly opened pit sites located in the southern part of the Province for the upgrading of a number of dams in the Musquash Watershed area. These pit sites were opened only for the extraction of material for dam restoration and were fully rehabilitated upon completion of the project. This needed upgrade will now enable the dams to survive a 1 in 10 000 year storm event.

Other construction needs across the Province resulted in the removal of approximately 125 000 t of material from pits and quarries located on Crown land.

The inventory of Crown land pits and quarries continued in 2001, with approximately 84 new sites being inspected, bringing the total number of inventoried sites to 729.

COMMITTEES John Griggs is a member of the Federal–Provincial–Territorial Committee on Mineral Statistics, which coordinates the efforts of Natural Resources Canada and the provincial and territorial governments in the timely collection of relevant mineral statistics while attempting to minimize the burden to the respondent. The annual meeting was held in Ottawa in May, 2001. Cory Neumann is a member of the University of New Brunswick Groundwater Studies Group, which looks at groundwater issues of interest in New Brunswick and the Maritimes and serves as a vehicle for information exchange between different levels of government, educational institutions, research institutions, and the private sector.

John Griggs is a member of the Intergovernmental Working Group. This is a national committee consisting of provincial and federal representatives, which provides input to the federal government regarding research and development programs on mining technology which are of mutual interest to all provinces within Canada.

John Griggs, and Cory Neumann are members of the interdepartmental Standing Committee on Mining and the Environment, which was established in 1989. The committee meets regularly during the year to address mining and environment issues.

CONFERENCES/WORKSHOPS In April 2001, John Griggs participated in the Prospect Exchange sponsored by the Canadian Association of Petroleum Landmen and held in Calgary, Alberta. This annual event provides a venue for the hydrocarbon industry's various stakeholders to meet, negotiate agreements and promote their investment potential.

Mineral Information Services

This section (Figure 1d), made up of two work units: Geoscientific Support Services and Geoscientific Information Services, is responsible for providing a variety of geoscientific, technical, and support services to the staff of the Minerals and Energy Division and to the clients of the Department of Natural Resources and Energy. Specifically, the staff (D.J.J. Carroll, C.M. McNeill-Dobbelsteyn, T.L. Leonard, and K. Harichane (casual)) provides assistance to the public and the mineral industry by supplying publications on the geology and mineral resources of the Province.

Some other responsibilities include publicizing the Division's extensive electronic, hard-copy, and on-line geoscientific databases in addition to promoting mineral exploration activity in New Brunswick. This unit also carries out the collection and collation of mineral exploration expenditures. In addition to providing services to the mineral industry and public sectors, the section provided support services such as graphic and cartographic design to the staff of the Division.

The Mineral Information Services Section continue to work closely with the Public Service Section of the Department to ensure that our clients (mainly mining, mineral exploration and engineering sectors) are continuing to receive quality service when it comes to the acquisition of geoscience publications. In January of 2001, a geoscience information officer position that was transferred to the Public Service Sector a few years earlier was transferred back to the Minerals and Energy Division.

After a trial period with follow-up changes based upon suggestions that came forth, the Geoscience Publication Indexing System (GPIS) was set up as a link on the Minerals and Energy Division's web site (http://www1.gnb.ca/0078/GeoscienceDatabase/index.htm).

PUBLICATIONS An important function of the Mineral Information Services unit is the dissemination of geoscience publications to the mineral exploration industry as well as to engineering, consulting, and environmental firms.

In 2001, approximately 500 requests for geoscience information were answered. The majority of these requests came from three main user groups: the mineral industry, consultant and engineering groups, and agencies of the federal and provincial governments. The number of requests for geoscience information from the oil and gas sector continued to increase. This change is due primarily to the heightened interest in exploration for nonrenewable resources in southeastern New Brunswick.

Mineral Information Services prepared 5 publication notices that were sent to more than 300 clients on our mailing list. These notices publicized 61 plates and 13 geoscience and technical reports. The following is a summary of the contents of the 2001 notices.

April: *List of new publications available*: 5 maps, and 6 reports.
Mailing list update notice was sent to 344 clientele.

May: *Timed release:* Open File 2001-2: "Till geochemistry of part of the west half of the Coldstream (NTS 21 J/06) map area, Carleton and York counties, New Brunswick." Release date: June 19, 2001.
Timed release: Plates 2001-7A & 7B: "Till geochemistry of Codys map area (NTS 21 H/13), New Brunswick." Release date: June 26, 2001.

June: *Timed release*: Plate 2001-26: preliminary map - "Au, Sb, As and Co in tills of the McDougall Lake area, NTS 21 G/07W, New Brunswick." Release date: July 17, 2001.
Mailing list update last chance notice was sent to 343 clientele
Notice of Information: 26th Annual Review of Activities post-it notice.

September: *Registration package*: 26th Annual Review of Activities (preliminary agenda, field trip notice, workshop notice, registration form, etc.)

November: *List of new publications available:* 53 maps, and 6 reports. (Mailing list update notice was sent to 356 clientele, 88 by e-mail and 268 hard copy)

The distribution and sale of geoscientific publications from the Fredericton office in 2001 totaled 2933 documents, a 23% decrease from the 2000 total of 3797. More than 65% of the publications sold in 2001 were requested by the mineral industry, hydrocarbon and engineering sectors. The sale of digital data files in 2001 was up substantially from 2000. This year 10 requests were received from 9 separate clients resulting in approximately 47 digital files being sold and $680 being generated in revenue. This total revenue figure represented a 100% increase from 2000 sales. Revenue generated from the sale of publications and photocopies for all three Division offices (Bathurst, Fredericton, Sussex) in 2001 was $19 460, a 16% increase from 2000.

MINERAL EXPLORATION REPORTS OF WORK A total of 96 mineral exploration reports of work were filed with the Resource Rights Allocation Section in 2001, which represented a 5 % increase from the 91 reports submitted in 2000. The dollar value of work reported in these documents ($6 076 251) was down 25% from that reported in the previous year ($8 193 208). To date, 5487 reports of work have been filed with the Resource Rights Allocation Section. They are maintained by Mineral Information Services.

The Mineral Exploration Reports of Work or more commonly called assessment file reports, are one of the key information sources that have been indexed for inclusion in the Geoscience Publication Index System, now available on-line. Approximately 80% of the current total of 5487 mineral exploration reports of work have been indexed and are now available for searching in the GPIS database.

ANNUAL EXPLORATION SURVEYS Mineral exploration expenditure surveys are carried out by Natural Resources Canada, assisted by the New Brunswick Department of Natural Resources and Energy (Mineral Information Services Section). The exploration expenditures are collected through two surveys each year. The Preliminary/Forecast expenditure survey in September was followed by the Actual survey in January. Table 3 summarizes the results of the most recently available surveys. Figure 5 presents historical data on mineral exploration expenditures for New Brunswick.

Table 3. Summary of Mineral Exploration Expenditure Surveys
(Source: Natural Resources Canada)

Form No.	Survey Name	Number Surveyed	General Exploration	Mine Site Exploration	Total*
Ex-1	Preliminary '00	57**	$ 8 400 000	$ 2 000 000	$10 400 000
Ex-3	**Actual '00**	**45**	**9 600 000**	**2 400 000**	**12 000 000**
Ex-1	Forecast '01	57**	7 700 000	2 500 000	10 200 000
Ex-1	Preliminary '01	56	6 200 000	2 100 000	8 300 000
Ex-3	**Actual '01**	**52**	**7 200 000**	**2 200 000**	**9 400 000**
Ex-1	Forecast '02	56	2 200 000	1 100 000	3 300 000

n/a not available
* Survey includes overhead expenditures
** Individual claim holders grouped and survey results combined on one form

PUBLIC AWARENESS / PROMOTION The Mineral Information Section is responsible for publicizing the Minerals and Energy Division's extensive geoscience information base and encouraging investment in our provincial mineral resources. Meetings such as the 2001 Annual Cordilleran Exploration Roundup in Vancouver, the 69th Annual International Convention and Trade Exhibition of the Prospectors and Developers Association of Canada in Toronto (March) and the Division's 26th annual Review of Activities in Fredericton (November) continue to be the main targets of our promotion campaign in 2001.

Attendance at the Annual Cordilleran Exploration Roundup in Vancouver (January 21–26, 2001) by two staff members, Reg Wilson and Don J.J. Carroll, represented the sixth opportunity for the Division to tap into the western Canadian market as part of its promotional strategy to attract mineral exploration investment dollars to New Brunswick.

In addition to Division staff, the New Brunswick delegation at the Cordilleran Roundup included Wayne Lockhart, William Gardiner and Mike Taylor. This year, as in 2000, the New Brunswick Prospectors and Developers Association did not send a representative to the Cordilleran Roundup, but instead supported two members to attend the March 2001 Prospectors and Developers Association conference in Toronto.

The second major conference that the Division attended in 2001 was the Annual International Convention and Trade Exhibition of the Prospectors and Developers Association of Canada (PDAC), which was held in Toronto on March 11–14. Once again, the venue for the Trade Exhibition was the Metro Convention Centre. The focus of the New Brunswick display this year was two-fold, to provide information on gold environments in New Brunswick and to promote exploration in the Bathurst Mining Camp–Restigouche area.

The Geological Surveys Branch also continued its efforts to financially assist members of the New Brunswick Prospectors and Developers Association (NBPDA) whose mineral properties warrant broader attention and publicity. Two prospectors, Rufus Smith and Peter Fenety were provided financial support to attend this conference; the Department also provided financial support to the NBPDA's Atlantic Canada Rock Room. In addition to these two prospectors, the New Brunswick contingent in the Rock Room included K.D.A. Whaley (Mactaquac Mining Limited), Terry Mersereau, Frank Ross and Wayne Lockhart.

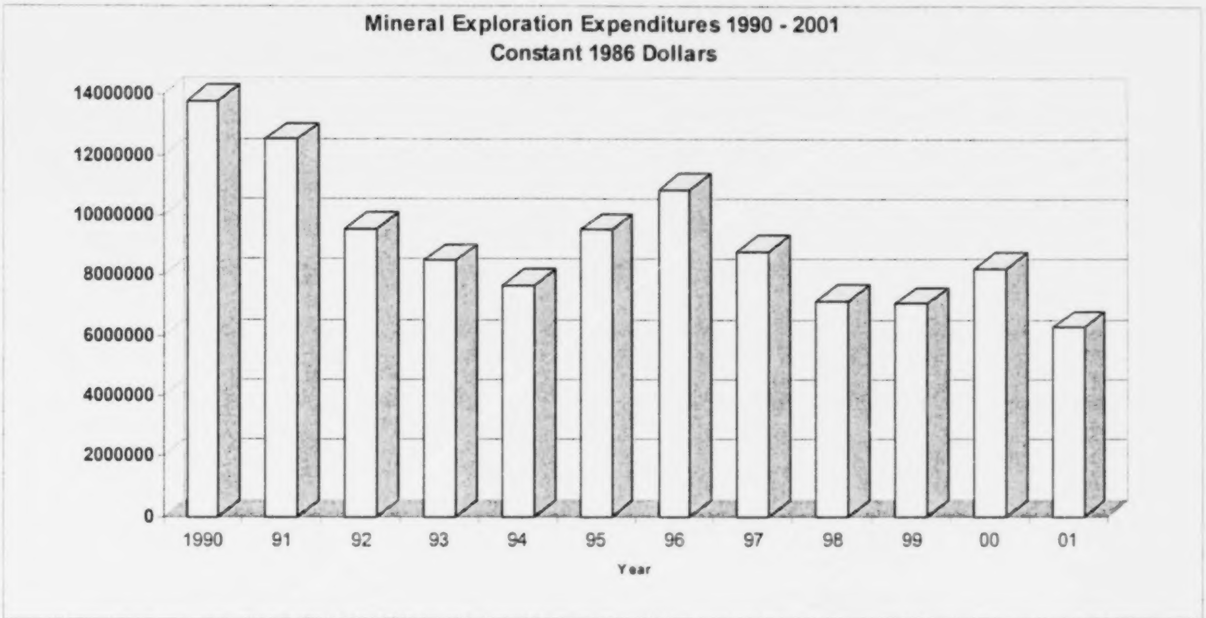


Figure 5. Total annual expenditures (general and mine-site exploration, includes overhead) by mining and exploration companies in New Brunswick, 1990 to 2001. Source: Natural Resources Canada ($1986=100).

In 2001, several New Brunswick service sector companies exhibited at the PDAC convention in Toronto, including Thibault & Associates, Major Drilling Inc., Universal Systems and the New Brunswick Research and Productivity Council (RPC). Exploration companies that highlighted New Brunswick properties in the Investor's Exchange were Freewest Resources Canada Inc. and Eastmain Resources Inc.

ADVERTISEMENTS/EDITORIALS An editorial was published in the Prospectors and Developers Association of Canada Digest (March 2001): 'Still some hope left in New Brunswick's Bathurst Mining Camp.'

REVIEW OF ACTIVITIES In 2001, the Minerals and Energy Division hosted the 26th annual Review of Activities (November 5–7, 2001) at the Sheraton Hotel in Fredericton. Following on the heels of the very successful 2000 annual review that marked the event's 25th anniversary, attendance at this year's event was the fifth highest on record, 257 delegates.

For the second year in a row, a pre-meeting workshop (Sunday, November 4, 2001) was organized by Professor David Lentz of the University of New Brunswick, Geology Department. This year, the student Chapter of the Society of Economic Geologists (SEG) played a key co-host role in the workshop that was titled "Mineralized Shear Zones: Structural Kinematics to Fluid Flow." Key speakers included Drs. François Robert (Barrick Gold), Paul Williams (University of New Brunswick), Adrian Park (University of New Brunswick), Shoufa Lin (University of Waterloo) and David Lentz (University of New Brunswick). Approximately 50 people attended the workshop.

The program for this year's Review of Activities commenced with a concurrent pre-conference geological field trip to southwestern New Brunswick and a computer workshop on Monday, November 5, 2001. The focus of the field trip was on gold, in particular the work being done by Freewest Resources Canada Inc. in southwestern New Brunswick. This year's trip was coordinated through the University of New Brunswick Geology Department and involved graduate student Ms. Kay Thorne and Dr. David Lentz. A published Field Guidebook titled "The Clarence Stream Gold Deposit, Southwestern New Brunswick" was included as part of the field trip package. This year's trip was led by Don Hoy (Freewest Resources Canada Inc.) and consulting geologist, Glenn Lutes. The field trip attracted more than 50 participants from various parts of New Brunswick and eastern Canada.

The second pre-meeting event was the computer workshop sponsored by the Department of Natural Resources and Energy. It's purpose was to increase the awareness of digital data sets, and data formats that are currently being used by government and industry, in New Brunswick. The topics covered in the workshop included methods of geoscience data capture, storage and distribution. Key speakers included Rejean Castonguay (Service New Brunswick), Frank Kiss (Geological Survey of Canada), Rick Nyarady (Universal Systems Limited), Tony Hall (Service New Brunswick), James Rupert (Geological Survey of Canada), and Paul Rennick (New Brunswick Department of Natural Resources and Energy). In addition to the presentations, there were several demonstrations for the participants to view. Approximately 30 people took part in the workshop.

The 26th Annual Review of Activities began on Monday evening with the traditional Trade Show reception hosted by Business New Brunswick. This was also the time for delegates to mingle amongst the various poster displays and to discuss with the exhibitors their research – field findings.

The first social event of the conference was "The Gold Bar," which provided an opportunity for delegates to mingle and network with their colleagues. It was sponsored by Activation Labs Ltd and Freewest Resources Canada Inc. Several beautiful photographs of various types of gold, refined and native, adorned the walls at the event, and were provided courtesy of the Pacific Mineral Museum in Vancouver. The Flying Scotsman, Frank Taylor, provided this year's entertainment.

On Tuesday, the technical program offered the delegates a cross section of talks by approximately 27 presenters from the mineral and hydrocarbon exploration and mining industry; the federal, provincial, and state governments; universities; and geoscience organizations. The opening speakers in 2001 were the Hon. Jeannot Volpé, Minister of Natural Resources and Energy, A. Rivera of the Geological Survey of Canada, T. Martel of Corridor Resources Inc., A. Vickers of the New Brunswick Prospectors and Developers Association and Rao Irrinki, Director of the New Brunswick Geological Surveys Branch. Steve McCutcheon and Malcolm McLeod gave updates on the activities in the northern and southern regions of New Brunswick and the final presentations of the morning were by Clinton St. Peter (hydrocarbons) and Tim Webb (industrial minerals), all staff of the Geological Surveys Branch. The afternoon technical session consisted of talks by several Geological Surveys Branch staff, Sandra Barr of Acadia University, J. Davis of Schlumberger Oilfield Services, D. Robinson of Eastmain Resources Inc., G. Graves of Noranda Inc., A. Wills of University of New Brunswick, S. McClenaghan of University of Ottawa, and K. Witherly of Condor Consulting Inc.

The traditional Tuesday evening banquet, attended by more than 150 individuals, featured University of New Brunswick Professor and Director of the Planetary and Space Science Centre, Dr. John Spray as guest speaker. Dr. Spray spoke on the topic of: "Deep Impact in the 21st Century."

On Wednesday morning, November 7, a special industry forum called " New Brunswick's Mineral / Hydrocarbon Potential" was held. The session consisted of four specific sector themes: (1) base metals, (2) gold, (3) industrial minerals, and (4) hydrocarbons. Eight speakers and nine additional panel members representing the mining, exploration, prospecting and hydrocarbon sectors addressed the many non-renewable resource issues facing New Brunswick as it moves into the next millennium. Several excellent suggestions were offered as well as new ideas to embrace. These will be reviewed by the Department in the upcoming year.

This year, more than 40 exhibits and posters were displayed by federal and provincial government agencies, the mineral industry, prospectors, service companies, and the various associations. Once again, the New Brunswick Core Shack provided prospectors and junior mining companies with an opportunity to promote their mineral properties in New Brunswick.

The annual Review of Activities also provides an opportunity for mineral-related groups or associations to hold annual or general meetings. The New Brunswick Prospectors and Developers Association and the New Brunswick Peat Association arranged meetings for their membership in conjunction with the Review. In addition, other subsidiary meetings were scheduled around the Review, such as a Geological Survey of Canada – New Brunswick Department of Natural Resources and Energy meeting and a New Brunswick Oil and Gas Regulatory Review meeting.

The 26th annual Review of Activities attracted 257 registrants, the 5th highest numbers ever recorded at this conference.

In previous years, a post-conference survey of staff was conducted, asking for comments or suggestions on how to improve the Review of Activities meeting. Following the 2001 Review, a survey of some of our non-government delegates was carried out. Based on 10% of the total attendance population (257) and based on the proportion from each of the various sectors, 25 people were surveyed: 5 – mineral industry, 3 – mineral exploration, 2 – hydrocarbon, 7 – consultants, 6 – prospectors, 3 – service companies. The results of the survey indicate that the majority of the delegates responding feel that the Review of Activities is one conference that is highlighted into their annual program and serves as an important venue for them to become aware of what's happening in New Brunswick.

PUBLIC AWARENESS – New Brunswick Mining Week One of the major public awareness activities for the mineral industry in New Brunswick is Mining Week. A unique approach to Mining Week 2001 was the cooperative effort between The Great Canadian Mine Show organizers and the New Brunswick Mining Association, New Brunswick Prospectors and Developers Association and New Brunswick Department of Natural Resources and Energy. The Great Canadian Mine Show was a cross-Canada road show developed to inform the general public, including students, about the significance of mining to the lives of Canadians. The show illustrated the importance of mining in our daily lives and in the cultural, historical and economic development of Canada.

The Mine Show was housed in a hydraulically expanding trailer that used cutting-edge interactive simulators, digital animation, computer games, touch displays, audio and live action to entertain and inform the public. Each module pairs digital technology with actual mining-related activities across the country, from a helicopter simulation supporting diamond exploration in the Northwest Territories, to "being" zinc as it is processed in British Columbia, to watching the transformation of "old" Sudbury into a green, rehabilitated landscape.

Visitors to the Great Canadian Mine Show experienced the sounds, sights, and sensations of mining's phases as well as the environmental safeguards used by industry at each step. This included exploration, building a mine, extraction, processing, "a day in the life of a miner," and rehabilitation of the mine site following mine closure.

Accompanying the Great Canadian Mine Show on its New Brunswick tour was a large tent that housed several displays on mineral prospecting and exploration in New Brunswick. Visitors learned about the discovery of gold in southwestern New Brunswick, oil and natural gas in southeastern New Brunswick, potash in the Sussex area, and the history of the Bathurst Mining Camp (copper, lead, zinc) in northern New Brunswick. Don Hattie, geologist from Sackville, New Brunswick, played a key role in providing information to the general public about the various facets of prospecting. In New Brunswick, the Great Canadian Mine Show visited Sussex, Fredericton, Bathurst, and Moncton between September 8th and 18th, 2001.

Another public awareness event involving the Geological Surveys Branch was the participation in the Moncton Museum's special exposition called "Minerals Matter." The material for this exhibition was on loan from the New Brunswick Museum. As part of the closing ceremonies, the New Brunswick Department of Natural Resources and Energy and the New Brunswick Mining Association were invited to participate by exhibiting complementary display material. Other participants included K.D.A. Whaley and Gary Plewes.

CONFERENCES / WORKSHOPS Don J.J. Carroll participated in the Annual Cordilleran Exploration Roundup in Vancouver, British Columbia in January and the Annual International Convention and Trade Exhibition of the Prospectors and Developers Association of Canada in Toronto, Ontario in March. He was in charge of organizing the Division's annual Review of Activities, held in Fredericton in November.

Energy Secretariat

Darwin Curtis, Director

The Energy Secretariat is responsible for fostering a secure supply of competitively priced energy through policy and regulatory activities relating to energy resources, infrastructure and markets. It is also responsible for promoting energy efficiency and air emissions reduction.

The Secretariat administers the following statutes and their related regulations: *Electric Power Act; Gas Distribution Act 1999; Public Utilities Act; Gasoline, Diesel Oil and Home Heating Oil Pricing Act;* and *Energy Efficiency Act.*

The Energy Secretariat, formed in the 2000–2001 Budget, currently operates as a branch within the New Brunswick Department of Natural Resources and Energy (Figure 1e) and is staffed with people formerly with the Mines and Energy Branch. It is a continuing body of experts that is responsible for developing and implementing energy policy and programs. All aspects of energy are covered including energy resource development, infrastructure and markets development and regulation. Energy efficiency and air emissions reduction are promoted through policies, programs and regulation. Energy supply and demand and commodity price statistics are compiled and analyzed.

COMMITTEES Darwin Curtis is a member of the National Air Issues Coordinating Committee (Climate Change) and attended regular meetings of the committee in Vancouver, British Columbia in July; Quebec, Quebec in July; Ottawa, Ontario in August; and Halifax, Nova Scotia in November. He attended a special meeting on federal–provincial funding on climate change in Toronto in June. He accompanied the Minister to the Canadian Energy Ministers' Meeting in Quebec, Quebec in September; the Joint Meeting of Ministers of Energy and Environment in Winnipeg, Manitoba in September, in Toronto, Ontario in October, and in Victoria, British Columbia in February. He is a member of the National Advisory Council on Energy Efficiency and attended a regular meeting in Whitehorse, Yukon in June. He is also a member of the Pipeline Regulation Task Force and monitored its activities through conference calls.

CONFERENCES Darwin Curtis attended no conferences in the period.

MINE TAXATION

Reporting to the Director of Financial Services, the Mine Assessor, Tanis A. Taylor, is responsible for the collection of all revenue due the province from mineral taxation and royalties.

The Mine Assessor is responsible for the administration of various Acts as they relate to the collection of taxes and royalties due the province, and is required to provide estimates for Central Government regarding the amount of revenue expected from each source. The Acts involved are: *Metallic Minerals Tax Act*, *Mining Act*, *Quarriable Substances Act*, and *Oil and Natural Gas Act*. Taxes and royalties collected in 2001–2002 amounted to $8 847 400. The metal mines subject to the *Metallic Minerals Tax Act* are required to make monthly payments, based on an estimate of the amount of taxes owing, and submit an annual tax return within six months of their year end. These annual returns are audited and assessment notices are issued. On-site audits as well as desk audits are conducted on companies subject to the *Metallic Minerals Tax Act* to determine compliance with the Act. On-site audits are also conducted on producers of other commodities to determine compliance with the appropriate acts.

Royalties are collected as follows: Monthly—coal, natural gas; Quarterly—potash, salt, oil; Semi-annually—peat moss, sand and gravel.

Provincial Mine Assessors and Mineral Revenue Assessors hold an annual conference in order to discuss matters of mutual concern associated with mineral taxation and collection.

MINING COMMISSIONER'S REPORT

Mr. John D. Hazen [P.O. Box 690, 132 Main Street, Bathurst, New Brunswick, E2A 3Z6; Telephone (506) 545-9220; Fax (506) 545-9224].

In 2001, a dispute between Joel Mercer (applicant) and Brookville Manufacturing Co. (respondent) was settled when Allan Higgins applied to have the mineral claims cancelled.

During the year, a dispute between Earnest Brooks (applicant) and Forest Gate Resources (respondent) was heard by the Mining Commissioner.

MINERALS AND ENERGY DIVISION PUBLICATIONS

Reports

Carroll, B.M.W. (editor) 2001. Preliminary Review of New Brunswick's mineral industry, 2000. New Brunswick Department of Natural Resources and Energy, Minerals and Energy Division, Mineral Resource Report 2001-1, 23 p.

Carroll, B.M.W. (editor) 2001. New Brunswick's mineral industry, 2000. New Brunswick Department of Natural Resources and Energy, Minerals and Energy Division, Mineral Resource Report 2001-3, 111 p.

Carroll, B.M.W. (editor) 2001. Current Research 2000. New Brunswick Department of Natural Resources and Energy, Minerals and Energy Division, Mineral Resource Report 2001-4, 143 p.
S.M. Barr, C.E. White, and B.V. Miller Cambrian granitoid plutons of the Pocologan area and the continuation of the Brookville terrane to the Wolves Islands.
S.M. Barr, and C.E. White The Kingston Group: A redefined Silurian stratigraphic unit in southern New Brunswick.
P.W.B. Friske, M.W. McCurdy, S.J.A. Day, and R.J. McNeil Evaluation of total, partial and selective leach data from humus, B-horizon and till: a case study from the Clarence Stream gold property, southern New Brunswick.
L.R. Fyffe and J.F.V. Riva Regional significance of graptolites from the Digdeguash Formation of southwestern New Brunswick.
J.P. Langton, P. Benton, and R. van de Poll MapTool: a new software program for managing field data.
S.R. McCutcheon, J.A. Walker, and S.H. McClenaghan The geological settings of massive sulphide deposits in the Bathurst Mining Camp: a synthesis.
A.A. Seaman The Cloverdale As–Sb dispersal train, and other till geochemical anomalies in the west half of the Coldstream (NTS 21 J/06) map area, Carleton and York counties, New Brunswick.
J.A. Walker The Nine Mile Brook (Willett) massive sulphide occurrence, Bathurst Mining Camp, New Brunswick (NTS 21 O/08E).

Carroll, B.M.W. (editor) 2001. Rétrospective préliminaire de l'industrie minérale au Nouveau-Brunswick, 2000. Ministère des Ressources naturelles et de l'Énergie du Nouveau-Brunswick, Division des ressources minières et de l'énergie, Rapport sur les ressources minérales 2001-2, 24 p.

Carroll, B.M.W. (compiler / compilatrice) 2002. PUBLICATIONS: Available from the New Brunswick Department of Natural Resources and Energy, Minerals and Energy Division (1995–). New Brunswick Department of Natural Resources and Energy, Minerals and Energy Division, Supplementary List, 132 p. (Revised Feb. 2002) / PUBLICATIONS : Publications que les intéressés peuvent obtenir auprès du ministère des Ressources naturelles et de l'Énergie du Nouveau-Brunswick, Division des ressources minières et de l'énergie (1995–). Ministère des Ressources naturelles et de l'Énergie du Nouveau-Brunswick, Division des ressources minières et de l'énergie, liste supplémentaire, 132 p. (Revisé en février 2002)

McNeill-Dobbelsteyn, C.M. and Carroll, B.M.W. (compilers) 2001. Directory of goods and services for the exploration industry in New Brunswick (December 2001). New Brunswick Department of Natural Resources and Energy, Minerals and Energy Division, Information Circular 2001-2, 11 p.

McNeill-Dobbelsteyn, C.M. et Carroll, B.M.W. (compilatrices) 2001. Répertoire des produits et des services offerts à l'industrie de l'exploration minérale au Nouveau-Brunswick (décembre 2001). Ministère des Ressources naturelles et de l'Énergie du Nouveau-Brunswick, Division des ressources minières et de l'énergie, Circulaire d'information 2001-3, 13 p.

Ministère des Ressources naturelles et de l'Énergie du Nouveau-Brunswick. 2001. Une politique provinciale pour l'extraction de la tourbe — une stratégie de développement total pour le secteur de la tourbe au Nouveau-Brunswick. Division des ressources minières et de l'énergie, Dossier public 2001-10, 26 p. / New Brunswick Department of Natural Resources and Energy. 2001. A Provincial policy on peat mining — a total development strategy for the New Brunswick peat resource sector. Minerals and Energy Division, Open File 2001-10, 26 p.

St. Peter, C. 2000. Catalogue of well data for boreholes in the Maritimes Basin and Fundy Subbasin, New Brunswick. New Brunswick Department of Natural Resources and Energy, Minerals and Energy Division, Open File 2000-5, 235 p. (revised 2001)

St. Peter, C. 2000. Reflection seismic coverage of onshore and offshore New Brunswick, 1948–1999. New Brunswick Department of Natural Resources and Energy, Minerals and Energy Division, Open File 2000-7, 39 p. (revised 2001)

Seaman, A.A. 2001. An annotated bibliography of surficial geology (regolith) mapping, and investigations of glacial geology in New Brunswick (including till and soil geochemistry studies). New Brunswick Department of Natural Resources and Energy, Minerals and Energy Division, Open File 2001-1, 96 p.

Seaman, A.A. 2001. Preliminary report – till geochemistry of part of the west half of the Coldstream (NTS 21 J/06) map area, Carleton and York counties, New Brunswick. New Brunswick Department of Natural Resources and Energy, Minerals and Energy Division, Open File 2001-2, 51 p.

Thorne, K.G., Hoy, D. and Lentz D.R. 2001. Field guidebook: The Clarence Stream gold deposit, southwestern New Brunswick. New Brunswick Department of Natural Resources and Energy, Minerals and Energy Division, Open File 2001-9, 16 p.

Plates (see List of Publications for details)

Plates 89-126, -206 to -208, -131 to -133, 211, 213, 214 (12 profiles)

Seismic line profiles, Moncton Basin. Plates 89-126 (line 63 Y), 89-206 (line 66 A), 89-207 (line 66 B), 89-208 (line 66 X), 89-131 (line 66 Y), 89-132 (line 67 Y), 89-209 (line 68 B), 89-133 (line 69 Y), 89-210 (line 71), 89-211 (line 71 Y), 89-213 (line 75 X A), 89-214 (line 75 Y).Chevron Canada Resources Limited. 1984. [portions of seismic lines over Stoney Creek field have been released from confidentiality]

Plate 95-22A to J (9 maps)

Bedrock geology maps: Havelock/Cornhill (21 H/14f), Petitcodiac/Intervale (21 H/14g), Berry Mills/Mouth of Turtle Creek (21 I/02c), Lutes Mountain/Indian Mountain (21 I/02e), Shediac River/McQuade Brook (21 I/02f), North River/Salisbury (21 I/03a), Killams Mills/Nevers Brook (21 I/03b), Ridge Brook/Havelock (21 I/03c), Canaan/Gallagher Ridge area (NTS 21 I/03h). C. St. Peter. [scale: 1:20 000; revised 2001]

Brook/Havelock (21 I/03c), Canaan/Gallagher Ridge area (NTS 21 I/03h). C. St. Peter. [scale: 1:20 000; revised 2001]

Plate 98-32 (1 map)
Bedrock geological compilation of the Canterbury area (NTS 21 G/14), York County, New Brunswick. M.J. McLeod and S.C. Johnson. [scale: 1:50 000; revised 2001]

Plate / Planche 98-72 (1 map / carte)
New Brunswick standard oil and natural gas grid map. New Brunswick Department of Natural Resources and Energy. [scale: 1:600 000] / Cart normalisée de quadrillage pour le pétrole et gaz naturel du Nouveau-Brunswick. Ministère des Ressources naturelles et de l'Énergie du Nouveau-Brunswick. [échelle : 1:600 000].

Plate 2000-16 (1 map)
Carboniferous geology of the southwestern New Brunswick platform (Marysville subbasin). C. St. Peter [scale: 1:150 000; revised 2001]

Plate 2001-1 (1 map)
Carboniferous geology and gypsum/anhydrite resources of the Wilson Brook–Demoiselle Creek area (part of NTS 21 H/15), Albert County, southeastern New Brunswick. T.C. Webb [scale: 1:10 000]

Plate 2001-2 (1 map)
Carboniferous geology and gypsum resources of the Intervale–Hillgrove area (part of NTS 21 H/14), Westmorland County, southeastern New Brunswick. T.C. Webb. [scale: 1:10 000]

Plate 2001-4 (1 map)
Carboniferous geology and gypsum/anhydrite resources of the Sussex area (parts of NTS 21 H/12 and 13), Kings County, south-central New Brunswick. T.C. Webb [scale: 1:10 000]

Plate 2001-5 (1 map)
Carboniferous geological compilation map (1:150 000 scale) of southeastern New Brunswick, comprising NTS quadrangles 21 H/10, 15, 16; 21 I/01, 02; and 11 L/04. C. St. Peter [scale: 1:150 000]

Plate 2001-6 (1 map)
Well status index map, Stoney Creek oil and gas field, southeastern New Brunswick. C. St. Peter. [scale: 1:7500]

Plate 2001-7A, B (2 maps)
Till geochemistry, Codys map area (NTS 21 H/13): Au, As, Sb, Hg; Cu, Pb, Zn, Ag. A.G. Pronk. [scale: 1:50 000]

Plates 2001-8 to 2001-24 (17 maps)
Oil and natural gas grid map (scale: 1:50 000) with borehole locations: Waterford (21 H/11), Sussex (21 H/12), Petitcodiac (21 H/14), Hillsborough (21 H/15), Amherst (21 H/16), Port Elgin (21 I/01), Moncton (21 I/02), Salisbury (21 I/03), Harcourt (21 I/06), Buctouche (21 I/07), Rogersville (21 I/11), Newcastle (21 I/13), Burtts Corner (21 J/02), Grand Falls (21 O/04), Chatham (21 P/03), Tracadie (21 P/10), Burnsville (21 P/11).

Plate 2001-25 (1 map)
Carboniferous geology and gypsum resources of the Plaster Rock area (part of 21 J/14). T.C. Webb (scale: 1:20 000)

Plate 2001-26 (1 map)
Au, As, Sb, and Co in tills of the McDougall Lake map area (21 G/07). A.G. Pronk. (preliminary map; scale: 1:50 000)

Plates 2001-27 and 2001-28 (2 maps)
Geology maps: South Charlo River (NTS 21 O/16d), Balmoral (NTS 21 O/16e). J.P. Langton. [scale: 1:20 000]

Planche / Plate 2001-29 (1 carte / map)
Taux de déplacement des lignes de côte et de rivage le long de la flèche de Bouctouche, Nouveau-Brunswick, entre 1945 et 1996. / Coastline and shoreline rates of change along the Bouctouche Spit, New Brunswick between 1945 and 1996. J. LeBlanc, D. Bérubé, A. Robichaud. [échelle / scale : 1:10 000; partie de SNRC 21 I/10 et 21 I/07 / parts of NTS 21 I/10 and 21 I/07].

Plate 2001-30 to 2001-45 (16 maps)
Geology maps, Dipper Harbour (21 G/01d), Lepreau (21 G/01e), Ludgate Lake (21 G/01g), Chance Harbour (21 G/01f and part of 21 G/01c), Seeleys Cove (21 G/02b and parts of G/02c and g), New River Beach (21 G/02h and part of G/02a), Saint John (21 G/08a and part of 21 G/01h), Grand Bay (21 G/08b), Loch Alva (21 G/08c and part of 21 G/08d), Centreton (21 G/08h and part of 21 G/08g), Golden Grove (21 H/05d), Quispamsis (21 H/05e), Smithtown (21 H/05f), Dickie Mountain (21 H/12c and part of 21 H/12b), Hoyts Mountain (21 H/12d), Kiersteadville (21 H/12F and part of 21 H/12g). S.M. Barr and C.E. White [scale: 1: 20 000]

Plate 2001-46 (1 map)
Geology of the Pocowogamis Stream area (NTS 21 G/13g), York and Carleton counties, New Brunswick. L.R. Fyffe. [scale: 1:20 000]

Plate 2001-47 (1 map)
Recession of the coastline of Middle Island, City of Miramichi, between 1944 and 1996 / Recul de la ligne de côte de l'île Middle, ville de Miramichi, entre 1944 et 1996. D. Bérubé, P. Evans.

Plate 2001-48 (1 map)
Bedrock geology of the Sprinfield area (NTS 21 H/12f), southern New Brunswick. S.C. Johnson [scale: 1: 20 000]

Conference Papers and Posters Presented by Division Staff

BERUBE, D. 2001. Évolution géomorphologique de la Grande Plaine, île de Miscou, côte nord-est du Nouveau-Brunswick / Geomorphological evolution of Grande Plaine, Miscou Island, northeast coast of New Brunswick. Poster presented at the Conférence canadienne sur le littoral 2001 / 2001 Canadian Coastal Conference, Quebec City, Quebec. May 16-19, 2001.

CARROLL, B.M.W. (editor / rédactrice) 2001. Abstracts, 2001: 26th annual Review of Activities. New Brunswick Department of Natural Resources and Energy, Minerals and Energy Division, Information Circular 2001-1, 63 p. / Résumés, 2001 : 26e rétrospective annuelle des activités. Ministère des Ressources naturelles et de l'Énergie du Nouveau-Brunswick, Division des ressources minières et de l'énergie, Information Circular 2001-1, 63 p.

S.M. Barr, C.E. White, B.V. Miller, M.A. Hamilton Plutonic rocks of the Brookville terrane, southern New Brunswick, from Indian Mountain inlier to the Wolves Islands / Roches plutoniques du terrane de Brookville, Sud du Nouveau-Brunswick, de la fenêtre de Indian Mountain aux Îles Wolves.

S.M. Barr, C.E. White, D.V. Venugopal, M.A. Hamilton, J.A.R. Stirling Petrology and age of the Lower Coverdale high-Ti, P, and V gabbro–anorthosite complex and associated granite, Moncton area, New Brunswick / Pétrologie et age du complexe d'anorthosite–gabbroïque riche en Ti, P et V de Lower Coverdale et granite associé, région de Moncton, Nouveau-Brunswick.

C. Carrier, Y. Michaud, M. Allard Caractérisation et modélisation hydrogéologiques d'une tourbière ombrotrophe / Hydrologic characterization and modeling of an ombrotrophic peat bog.

J.I. Carroll Preliminary bedrock geology of the States Brook map area (NTS 21 O/13), northern New Brunswick / Géologie préliminaire du substrat rocheux du secteur cartographique du ruisseau States (SNRC 21 O/13), Nord du Nouveau-Brunswick.

J.I. Carroll Lithogeochemistry of Ordovician sedimentary rocks assocated with Ni–Co stream-silt anomalies along Ritchie Brook, Kedgwick map area (NTS 21 O/11 East), northern New Brunswick / Lithogéochimie des roches sédimentaires de l'Ordovicien associées à des anomalies de Ni–Co de limon fluviatile le long du ruisseau Ritchie, secteur cartographique de Kedgwick (SNRC 21 O/11 est), Nord du Nouveau-Brunswick.

G. Chi, S. Watters, L.R. Fyffe, M.J. McLeod, D.R. Lentz, X. Yang, K. Thorne, S. Castonguay, W. Davis, A. Tremblay, B. Dubé, M.M. Savard, S. Johnson, K. Lauzière, P. Rennick, D. Hoy Metallogeny of intrusion-related gold systems in southwestern New Brunswick / Métallogénie de systèmes aurifères apparentés à des intrusions dans le Sud-Ouest du Nouveau-Brunswick.

J. Davis, D. Spady The use of slim hole oil and gas logging tools in coring rig operations: evaluation of results from Columbia Natural Resources Canada, Ltd., southern New Brunswick / Utilisation d'instruments de diagraphie des puits de gaz et de pétrole à diamètre réduit dans les travaux de carottage : évaluation des résultats de la Columbia Natural Resources Canada, Ltd., Sud du Nouveau-Brunswick.

L.R. Fyffe Bedrock geology of the Pocowagamis Stream area, western New Brunswick (NTS 21 G/13g) / Géologie du substrat rocheux du secteur du ruisseau Pocowagamis, Ouest du Nouveau-Brunswick (SNRC 21 G/13g).

S.C. Johnson Bedrock geology and mineral occurrences in the West Scotch Settlement–Bull Moose Hill area, southern New Brunswick / Géologie du substrat rocheux et venues minérales dans le secteur de West Scotch settlement/colline Bull Moose, Sud du Nouveau-Brunswick.

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CHAPTER 2.
MINERAL EXPLORATION IN NEW BRUNSWICK

METALLIC MINERALS

Northern New Brunswick

The **major companies** that were active in 2001 include Hudson Bay Exploration and Development Co. Limited, Noranda Inc. and CanZinco Ltd. Falconbridge Limited, Phelps Dodge Corporation of Canada Limited and Teck Exploration Ltd. continued to hold land positions but no work was carried out on their claims in 2001.

The active **junior companies** in 2001 include Eastmain Resources Inc., Slam Exploration Ltd., Heron Mines Limited, Aurogin Resources Ltd. and Omni Mines Ltd. They collectively spent approximately $1 000 000. All of these companies received funding under the New Brunswick Junior Mining Assistance Program (NBJMAP). Other juniors, such as Black Bull Resources Inc., Chapleau Resources Limited, Connecticut Development Corporation, Freewest Resources Canada Inc., Major General Resources Limited, Marshall Minerals Corp., Mountain Lake Resources Inc. and PGE Resource Corporation held ground but little or no work was carried out on their claims during the year.

Major Companies Within the Camp: **Noranda Inc.** accounts for approximately $3 500 000 of the total exploration expenditure in northern New Brunswick, all of it within the Bathurst Mining Camp. From east to west, Noranda's land holdings are concentrated in six areas: Middle Landing–Lawson Brook, Brunswick–Portage River, Heath Steele, Middle River, Caribou–Indian Lake, and Mount Perley–Halfmile Lakes (Figure 6: 1–6). Notably, Noranda staked 89 new claims in 2001 but dropped significantly more claims, all of them in the Bathurst Mining Camp. Noranda had a total of 3777 claims in the camp on October 22nd when the news broke that the company's exploration office in Bathurst was closing.

Most of Noranda's work in 2001 was focused on the Middle Landing–Lawson Brook, Brunswick–Portage River, and Mount Perley–Halfmile Lakes areas (Figure 6: 1, 2, 6). Although in-hole, three-dimensional seismic surveys were planned for seven localities in the Brunswick–Portage River and Mount Perley–Halfmile Lakes areas, the work was done in only one locality, Halfmile Lakes, where staff from the Geological Survey of Canada carried out a test survey in one hole. However, the company contracted Quantec to do test surveys in each of the three areas using its time-domain, ground electromagnetic, and distributed-array system (DAS).

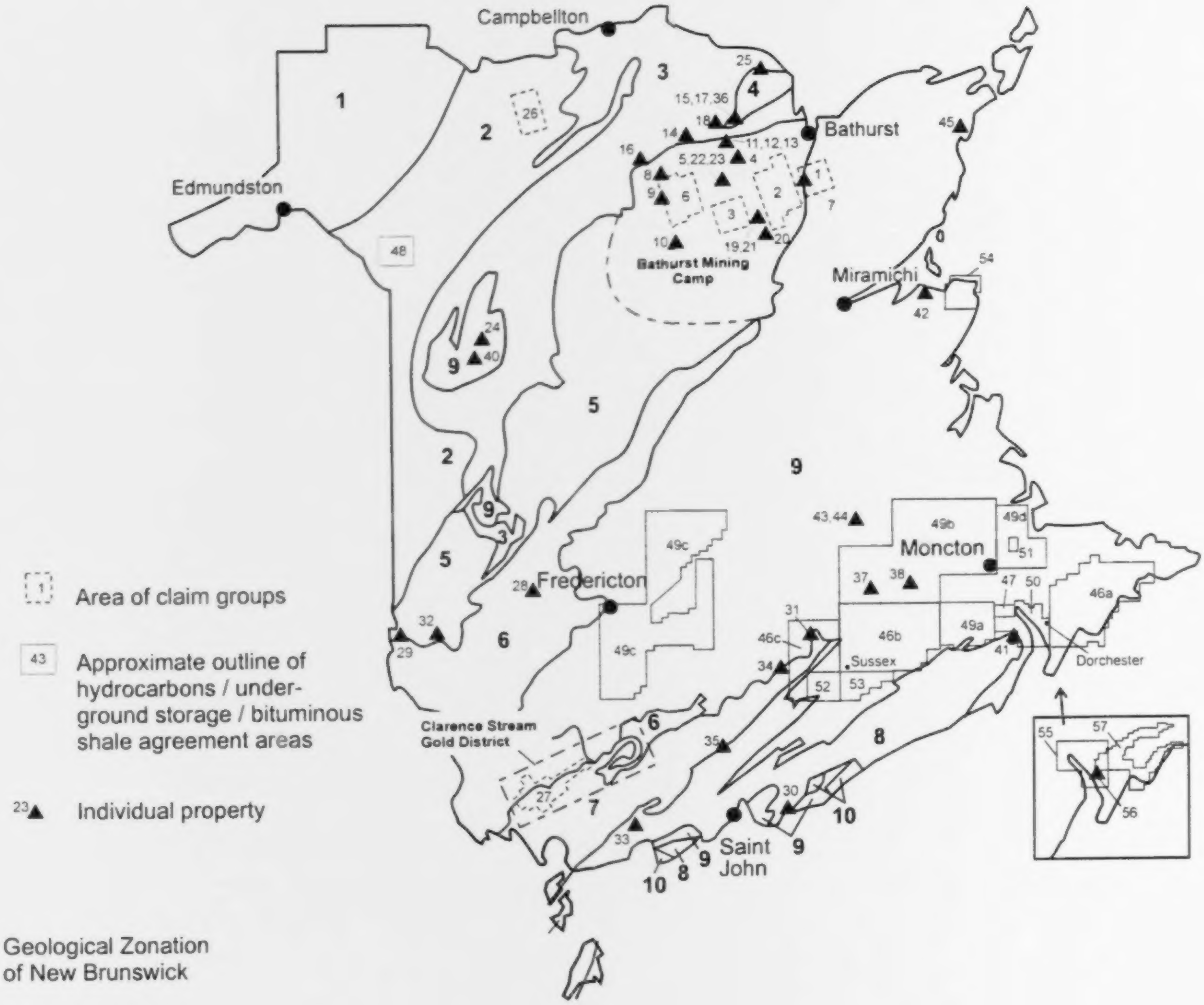
Late in 2000, Noranda reached an agreement with Hunter Brook Holdings Limited, one of the Irving Group of companies, to explore the Key Anacon property (Figure 6: 7) at Middle Landing, which is contiguous with its Middle Landing–Lawson Brook claim block. Eight holes, totalling 7341 m, were drilled early in 2001; approximately 15 900 m were drilled by year's end on this property.

In the Brunswick–Portage River belt (Figure 6: 2), 12 holes totalling approximately 1465 m were drilled west and south of the No. 12 Crown Grant. Another 17 holes totalling 4475 m were drilled in the southern part of the belt, mostly on the Narrows property.

In the Mount Perley–Halfmile Lake belt (Figure 6: 6), further drilling was carried out in the vicinity of the

Legend

1. Claims, Middle Landing–Lawson Brook area (Noranda Inc., Noranda Mining & Exploration Inc.)
2. Claims, Brunswick–Portage River area (Noranda Inc., Noranda Mining & Exploration Inc.)
3. Claims, Heath Steele area (Noranda Inc., Noranda Mining & Exploration Inc.)
4. Claims, Middle River area (Noranda Inc.)
5. Claims, Caribou–Indian Lake area (Noranda Inc., Noranda Mining & Exploration Inc.)
6. Claims, Mount Perley–Halfmile Lakes area (Noranda Inc., Noranda Mining & Exploration Inc.)
7. Claims, Key Anacon Mine (Hunter Brook Holdings Limited)
8. Claims, Mount Perley (Hudson Bay Exploration and Development Co. Limited)
9. Claims, Mount Moses area (Hudson Bay Exploration and Development Co. Limited)
10. Claims, Kenny Lake (Hudson Bay Exploration and Development Co. Limited)
11. Claims, Wildcat (CanZinco Ltd.)
12. Claims, Carroll–Roller (CanZinco Ltd.)
13. Claims, Murphy (CanZinco Ltd.)
14. Claims, Caribou North (CanZinco Ltd.)
15. Claims, Armstrong (CanZinco Ltd.)
16. Claims, Restigouche Project (CanZinco Ltd.)
17. Claims, Rocky Turn (CanZinco Ltd.)
18. Claims, Orvan Brook (CanZinco Ltd.)
19. Claims, Railroad (Eastmain Resources Inc.)
20. Claims, Sprig Brook (Eastmain Resources Inc.)
21. Claims, CNE (Eastmain Resources Inc.)
22. Claims, 40 Mile Brook (Slam Exploration Ltd.)
23. Claims, Strachens Lake–Ahearn Brook area (Slam Exploration Ltd.)
24. Claims, Lewis Brook (Slam Exploration Ltd.)
25. Claims, Belledune area (Heron Mines Ltd.)
26. Claims, Simpsons Gulch–Boland Brook area (A. Wayne Lockhart)
27. Claims, Clarence Stream area (Freewest Resources Canada Inc. and others)
28. Claims, Springfield (M. Stewart)
29. Claims, Golden Ridge (Freewest Resources Canada Inc.)
30. Claims, Gold Brook area (Pro-Max Resources Inc.)
31. Claims, Marrtown area (Pathfinder Resources Ltd.)
32. Claims, Eel River area (PGE Resource Corp.)
33. Claims, New River (PGE Resource Corp.)
34. Claims, Annidale area (PGE Resource Corp.)
35. Claims, McKeel Lake area (Annapolis Valley Goldfields Inc.)
36. Claims, Sormany area (Elmtree Resources Ltd.)
37. Claims, Springhill area (Lafarge Canada Inc.)
38. Claims, north of Havelock (Graymont (N.B.) Inc.)
39. Claims, Plaster Rock area (D.F. Merrithew)
40. Claims, French Village (Kingsway Materials Ltd.)
41. Claims, Demoiselle area (K. Whaley)
42. Peat exploration licence (Le Group Berger ltée)
43. Peat exploration licence (Premier Horticulture)
44. Peat exploration licence (Compagnie de Tourbe Fafard ltée)
45. Peat exploration licence (Jiffy Products (N.B.) Ltd.)
46. Oil and natural gas licences to search (Corridor Resources Inc.): a–Dorchester to Port Elgin; b–Moncton to Sussex; c–north and west of Sussex
47. Oil and natural gas lease (Irving Oil Limited)
48. Oil and natural gas licence to search (Jean Mariadassou)
49. Oil and natural gas lease and licences (Columbia Natural Resources Canada, Ltd.): a–Turtle Creek; b–Moncton area; c–Fredericton area; d–Moncton area
50. Oil and natural gas licence to search and leases (J.A. Seglund Inc.)
51. Oil and natural gas lease (RHT Enterprises Ltd.)
52. Oil and natural gas licence to search (Potash Corporation of Saskatchewan Inc.)
53. Oil and natural gas licence to search (Corridor Resources Inc. and Potash Corporation of Saskatchewan Inc.)
54. Oil and natural gas licence to search (Norton Energy Inc.)
55. Bituminous shale licence to search (Three-D GeoConsultants Limited)
56. Underground storage exploration licence (St. Clair Pipelines (1996) Ltd.)
57. Underground storage exploration licences (Intragaz)


Campbellton
Edmundston
Bathurst
Miramichi
Moncton
Fredericton
Sussex
Dorchester
Saint John
Bathurst Mining Camp
Clarence Stream Gold District
1
2
3
4
5
6
7
8
9
10
25
15,17,36
18
14
16
11,12,13
5,22,23
4
8
9
6
3
2
1
7
10
19,21
20
26
48
24
40
45
54
42
43,44
49b
49d
49c
51
37
38
47
50
46a
28
31
46c
46b
49a
41
34
52
53
32
29
35
27
33
30
55
57
56

Area of claim groups

Approximate outline of hydrocarbons / underground storage / bituminous shale agreement areas

23▲ Individual property

Geological Zonation
of New Brunswick

1. Edmundston
2. Kedgwick
3. Tobique-Chaleur
4. Elmtree
5. Miramichi
6. Fredericton
7. Passamaquoddy
8. Saint John
9. Maritimes Basin
10. Fundy Basin

Figure 6. Highlighted exploration properties in New Brunswick, 2001.

new Mount Fronsac North deposit, where approximately 17 000 m of drilling was completed in 2000. That drilling outlined 14 000 000 t of low-grade massive sulphides, including about 1 200 000 t grading 0.14% Cu, 2.18% Pb, 7.65% Zn, 40.3 g/t Ag and 0.40 g/t Au. Twelve holes totalling 2883 m were drilled in 2001.

Hudson Bay Exploration and Development Co. Limited conducted approximately 70 line-kilometres of horizontal-loop electromagnetic and magnetometer surveys on eight grids, and collected 1500 soil samples on five of them. Five holes, totaling 664 m, were drilled to test Spectrum airborne electromagnetic anomalies in the Mount Perley, Mount Moses, and Kenny Lake areas (Figure 6: 8–10). The anomalies were explained by graphitic sedimentary rocks.

CanZinco Ltd. conducted 23 line-kilometres of induced polarization on the Wildcat, Carroll–Roller, and Murphy properties (Figure 6: 11–13) in the northern part of the Bathurst Mining Camp. Several anomalies were outlined that warrant further work. CanZinco also contracted Eastern Geophysics to conduct Pulse electromagnetic surveys in four previously drilled holes on its Caribou and Armstrong properties (Figure 6: 14, 15). The preliminary results indicate at least one strong off-hole anomaly in hole 6006-98-9. The company also drilled five holes, totalling 1304 m, to test known induced polarization anomalies; two were drilled on the Restigouche property (one 600 m south and the other 800 m east of the deposit; Figure 6: 16). The other three were drilled on the Wildcat, Rocky Turn, and Orvan Brook properties (Figure 6: 11, 17, 18).

Junior Companies Within the Camp: **Eastmain Resources Inc.**, and option-agreement partner **Stratabound Minerals Corp.**, have the second largest land position (1179 claims) in the Bathurst Mining Camp after Noranda. Late in 2000, the company announced that Billiton would fund a drilling program on the Railroad property (Figure 6: 19) through a $700 000 private placement. The program began in June with two drill rigs, one testing the Railroad deposit and the other testing five targets elsewhere on the property. Twenty-three holes, totalling about 7000 m, were completed by late summer, 6 on the deposit and 17 elsewhere. Narrow, high-grade intercepts were encountered at the Railroad deposit (e.g., hole RRD-01-01 cut 0.5 m grading 33.4% Zn, 17.0% Pb, 0.4% Cu and 342 g/t Ag in a 10.3 m interval grading 5.3% combined Pb + Zn), which appears to be hosted by rocks of the Flat Landing Brook Formation. Three of the other targets yielded geologically significant results. At the Railroad Iron Formation Horizon, hole RR-01-06 cut 16 m of chlorite–magnetite iron formation near the top of the Nepisiguit Falls Formation (i.e., the Brunswick Horizon). At the Railroad Footwall Zone, drilling outlined an altered and sulphide-bearing zone about 600 m long within Nepisiguit Falls rocks. At Sprig Brook (Figure 6: 20), hole RR-01-12 intersected 20 m of disseminated and stringer sulphides. No further drilling is scheduled for 2001 on the Railroad property but the company plans to drill six holes on the CNE (Stratabound) property (Figure 6: 21) to test induced polarization targets.

Slam Exploration Ltd. added 25 claims to its 40-Mile Brook property (Figure 6: 22) near the Wedge deposit and staked 109 claims in the Strachens Lake–Ahearn Brook area (Figure 6: 23). Slam focused on the latter property and carried out a trenching program to expose the known O'Hearn [sic] massive-sulphide zone. Spectacular grades were obtained over narrow widths along a strike length of about 37 m. Values ranging from 44.2% to 56.1% combined Pb + Zn, and up to 520 g/t Ag were reported over widths of 0.43 m to 0.98 m. This sulphide zone appears to be hosted by rocks of the Flat Landing Brook Formation. Another 19 trenches were dug elsewhere on the Strachens Lake–Ahearn Brook property to test previously identified targets. As a result, massive sulphide boulders were uncovered 60 m north of the zone and a new occurrence was discovered 250 m east of it, from which a grab sample ran 2.3% combined Pb + Zn.

Companies Outside the Camp: Slam Exploration Ltd. dropped its large land position near the Clarinda gold property at Lower Tetagouche Lake and focused on its Lewis Brook Pb–Zn property (Figure 6: 24) near

Mount Costigan. Seven holes, totalling 763.8 m, were drilled on this property to test a bonanza-grade silver occurrence that was trenched in 2000. The best intersection was in hole LB0010 where a 1.2 m interval (73.5–74.7 m) graded 1.44% Pb, 1.18% Zn and more than 1700 g/t Ag.

Heron Mines Ltd. and joint-venture partner **Aurogin Resources Ltd.** announced in February that they had completed a 750 line-kilometre (50 km line spacing), helicopter-towed, time-domain electromagnetic (AEROTEM) survey, including magnetics, over their 283-claim property near Belledune (Figure 6: 25). A previously unknown electromagnetic anomaly, with a strike length of about 250 m, was detected and in late March to early April was tested by three drill holes without any ground truthing of the anomaly. Hole #3 intersected vein–stockwork mineralization between 3 and 287 m. The best assays reported within this interval ranged from 1.75 g/t to 4.9 g/t Au over 1.0 to 2.5 m. Subsequently, hole #3 was deepened to 354 m and both surface and down-hole Pulse electromagnetic suveys were carried out. A strong off-hole anomaly was detected at about 170 m in hole #3; consequently, another hole is planned to test this anomaly. Meanwhile, another 259 claims were staked to the west of the existing property and another 800 line-kilometres of airborne geophysics (AEROTEM and magnetic) were flown in the early fall of 2001. Aurogin reported that eight new strong conductors have been detected and that ground examination is underway to better define drill targets.

Omni Mines Ltd. plans to drill-test one or two localities on its properties in the Simpsons Gulch–Boland Brook area (Figure 6: 26). The objective is to determine if the large total-field magnetic anomaly in that area is caused by a buried intrusion, which may be the source of the nickel–cobalt stream-sediment anomalies.

Southern New Brunswick

Most exploration activities in southern New Brunswick for the 2001 calendar year were related to the delineation of reserves on known gold deposits and the discovery of new gold occurrences, particularly in the vicinity of Clarence Stream, east of St. Stephen (Figure 6). The intensity of exploration and the number of new finds in and around tin–tungsten-bearing felsic intrusions associated with the Saint George Batholith leave little doubt that a world-class, granite-related gold district is emerging in this part of the province. About 3400 claims had been staked by year's end in southern New Brunswick, well over half of which are for gold. More than $1 000 000 was expended on these exploration projects in 2001. It is anticipated that there will be several hundred more claims recorded for gold in the region in 2002, and that the exploration expenditures will increase accordingly.

Gold Exploration in the Clarence Stream District: The exploration effort in the Clarence Stream area has been spearheaded by several junior mining organizations and by numerous local prospectors and their companies. **Freewest Resources Canada Inc.**, one the main players, has drilled 64 holes to date on its property at Clarence Stream (Figure 6: 27) where potentially mineable, high-grade mineralization was intersected in parts of the East, Central, Cox, West and North zones. Two very promising new discoveries, anomalies A and B, have been located on the property about 3 and 2 km northwest and southwest of the original showings, respectively. All of these occur within metamorphosed volcanosedimentary sequences and metagabbros peripheral to granitoid intrusions.

Other junior companies working in this area include **Rubicon Minerals Corporation**, **Union Gold Inc.**, **Fancamp Resources Ltd.**, **Murgor Resources Inc.**, **Golden Hope Mines Limited**, and **PGE Resource Corporation**. Many of these companies have also conducted extensive exploration on their properties with promising results. For example, immediately southwest and along strike of Freewest's discovery zone, Union Gold Inc. has delineated highly prospective drill targets based on detailed geochemical and geophysical surveys. Another example is Fancamp Resources Ltd. who discovered new gold showings in a similar geological environment several kilometres along strike to the northeast (Figure 6: 27).

A group of local prospectors and explorationists, including **William Gardiner** (Southfield Resources Ltd.), **Emilio Doiron** (Pro-Max Resources Inc.), **Terry Mersereau** (Northeast Exploration Services Limited), **Peter Fenety**, **David Stevens**, and **Raymond Thorn**, have been very active on several claim groups in the district. The group has delineated numerous zones with high potential based on geochemical surveys, geological mapping and prospecting.

Gold Exploration Outside the Clarence Stream District: Other gold properties associated with felsic to intermediate intrusions in southern New Brunswick were also investigated during 2001, particularly in the contact zone of the Pokiok Batholith near Springfield and in the Poplar Mountain area, both west of Fredericton (Figure 6: 28, 29). **Merton Stewart**, working with TNR Resources Ltd., conducted geochemical surveys and a drilling program on the Springfield property (Figure 6: 28). Significant gold mineralization was located on the property and it is anticipated that this work will generate additional exploration in this region. **Freewest Resources Canada Ltd.** maintains large holdings in the Poplar Mountain area (Figure 6: 29), where widespread gold mineralization in structural zones are intimately associated with a high-level, intermediate intrusion. At year's end, the company was seeking joint venture partners to further develop this huge resource.

South of Saint John in a northeasterly trending belt along strike from the Cape Spencer gold mine, **Pro-Max Resources Inc.** continued its work on properties in the vicinity of Gold Brook (Figure 6: 30) and has discovered several high-grade gold showings along shear zones in this gold-rich thrust belt. Continuity of well-defined structures hosting auriferous veins has been demonstrated over a distance of more than 2 km on the property.

In the latter part of 2001, **Southfield Resources Ltd.** and **Pro-Max Resources Inc.** have discovered a gold–antimony system associated with shear and stockwork zones in a highly altered gabbro–basalt complex north of Sussex at Marrtown (Figure 6: 31). Pathfinder Resources Ltd. will be conducting further exploration on the property. Results of prospecting are preliminary, but initial results indicate that there could be a very significant gold-bearing system in this previously unrecognized geological environment in southern New Brunswick.

Exploration for Other Commodities: Exploration for base-metal sulphides also continued in a few areas of southern New Brunswick. **Patrick Marr** continued work on his Eel River claims west of Fredericton (Figure 6: 32). He has been successful in tracing stratiform massive sulphide horizons across his claim group and has delineated drill targets based on geophysical surveys. **PGE Resource Corp.** also continued working on its properties at New River and Annidale (Figure 6: 33, 34), west and north of Saint John, respectively. Both these areas have good potential for volcanogenic massive sulphide deposits when compared to similar environments that contain known deposits to the southwest in Maine.

Annapolis Valley Goldfields Inc. has conducted a limited amount of exploration for tantalum in the region. Targets for a planned drill program have been outlined in granites on the company's McKeel Lake property, north of Saint John (Figure 6: 35). This granite hosts the only tantalum-bearing rare metal occurrence in the region.

Technical Progress Reports

The following Technical Progress Reports were received in 2001:

Report No.	Company	Property	NTS	Release Date
PR10-126	Northeast Exploration Services Ltd.	Mitchell East	21 P/13W	06/30/1999
PR15-035	Northeast Exploration Services Ltd.	Middle River	21 P/12W	04/09/2003
PR15-036	Northeast Exploration Services Ltd.	Tower	21 O/08W	04/08/2003
PR15-037	PGE Resource Corporation	Mechanic Settlement	21 H/11W	05/09/2003
PR15-038	Maritime Resource Research Ltd.	Glebe Mine	21 H/11W	03/12/2003
PR15-039	Noranda Inc.	Mount Fronsac	21 O/08W	11/24/2002
PR15-040	Noranda Inc.	Otter Brook	21 O/08E	11/28/2002
PR15-041	Noranda Inc.	Heath East	21 O/08E	08/23/2003
PR15-042	Noranda Inc.	McCormack East & West	21 O/08E	08/23/2003
PR15-043	Northeast Exploration Services Ltd.	Mitchell	21 P/13W	06/11/1999

Mineral Exploration Reports of Work

During 2001, 96 reports of work were received by the Recorder in accordance with the *Mining Act*, Chapter M-14.1, S.N.B. 1985. These reports are summarized in tabular form on the following pages and their locations are shown on Figure 7. The name of the company or individual listed for each report of work is that of the holder of the mineral rights. Reports are arranged in the following order: (1) by the geological belt in which the claims are located, (2) alphabetically by company or individual, and (3) alphabetically by property name.

Claim Group	Geoscan No.	No. of Claims	NTS	Release Date	Description of Work
CARBONIFEROUS COVER					
27. Northeast Exploration Services Limited					
a. Route 8	475451	12	21 P/12E	Aug. 29, 2003	Grid establishment; biogeochemical survey.
MIRAMICHI ANTICLINORIUM					
2. CanZinco Ltd.					
a. Middle River/Wildcat	475435	16	21 O/09E	June 28, 2003	Grid establishment; induced polarization survey.
b. Orvan Brook	475439	17	21 O/09E	July 12, 2003	Diamond drilling.
c. Restigouche Project	475438	43	21 O/10E	July 09, 2003	Diamond drilling.
d. Rocky Turn	475437	6	21 O/09E	July 09, 2003	Diamond drilling.
e. Roller	475436	50	21 O/09E	June 28, 2003	Grid establishment and induced polarization survey.

Claim Group	Geoscan No.	No. of Claims	NTS	Release Date	Description of Work
3. Connell, Mark					
Dead Creek	475393	4	21 G/13E	Jan. 25, 2003	Grid establishment; collection of till and bark samples.
5. Eastmain Resources Inc.					
Railroad (and others)	475426	379	21 O/01E 21 P/05W	Apr. 04, 2003	Grid establishment; geologic mapping; magnetometer survey leveling and induced polarization surveys; collection and analysis of lithogeochemical and assay samples.
9. Forest Gate Resources Inc.					
a. Itty-Bitty	475461	1	21 O/08E	Sept. 10, 2003	Grid establishment; prospecting, geologic mapping; compilation.
b. Small	475462	2	21 O/08E	Sept. 13, 2003	Grid establishment; prospecting; geologic mapping; compilation.
13. Golden Bay Resources Inc.					
Maliseet Mountain	475389	2	21 O/08W	Jan. 18, 2003	Grid establishment.
14. Hansen, Philip					
a. Philmar Farms	475405	2	21 G/13E	Feb. 23, 2003	Prospecting; limited collection and analysis of water samples.
b. Philmar Farms	475415	2	21 G/13E	Mar. 22, 2003	Prospecting; limited collection and analysis of water samples.

Figure 7

Reports of Work

1. Black, Joey
2. CanZinco Ltd.
3. Connell, Mark
4. Cushnie, Wells
5. Eastmain Resources Inc.
6. Elmtree Resources Ltd.
7. English, Perry
8. Fenety, Peter
9. Forest Gate Resources Inc.
10. Freewest Resources Canada Inc.
11. Gallant, Gilles
12. Giroux, Ronald Lee
13. Golden Bay Resources Inc.
14. Hansen, Philip
15. Hattie, Don W.
16. Hudson Bay Exploration and Development Co. Limited
17. Hunter Brook Holdings Ltd.
18. Johnston, Anthony
19. Johnston, Delbert
20. Lafarge Canada Inc.
21. Log House Construction Ltd.
22. Marr, Pat
23. Nicon Holdings Ltd.
24. Noel, Lorenzo
25. Noranda Inc.
26. Noranda Mining and Exploration Inc.
27. Northeast Exploration Services Limited
28. O'Neil, David
29. PGE Resource Corp.
30. Phelps Dodge Corp. of Canada Ltd.
31. Pro-Max Resources Inc.
32. Ross, Frank
33. Ross, Frank and Donovan, Robert
34. Slam Exploration Ltd.
35. Southfield Resources Ltd.
36. Stevens, Dave
37. Stewart, Merton
38. Stewart, Ralph
39. Stratabound Minerals Corp.
40. Taylor, Bruce
41. Thorn, Raymond
42. Union Gold Inc.
    Vencan Gold Corporation
43. Watters, Sheila

Simplified Zones of New Brunswick:

1. Edmundston
2. Kedgwick
3. Tobique–Chaleur
4. Elmtree
5. Miramichi
6. Fredericton
7. Passamaquoddy
8. Saint John
9. Maritimes Basin
10. Fundy Basin

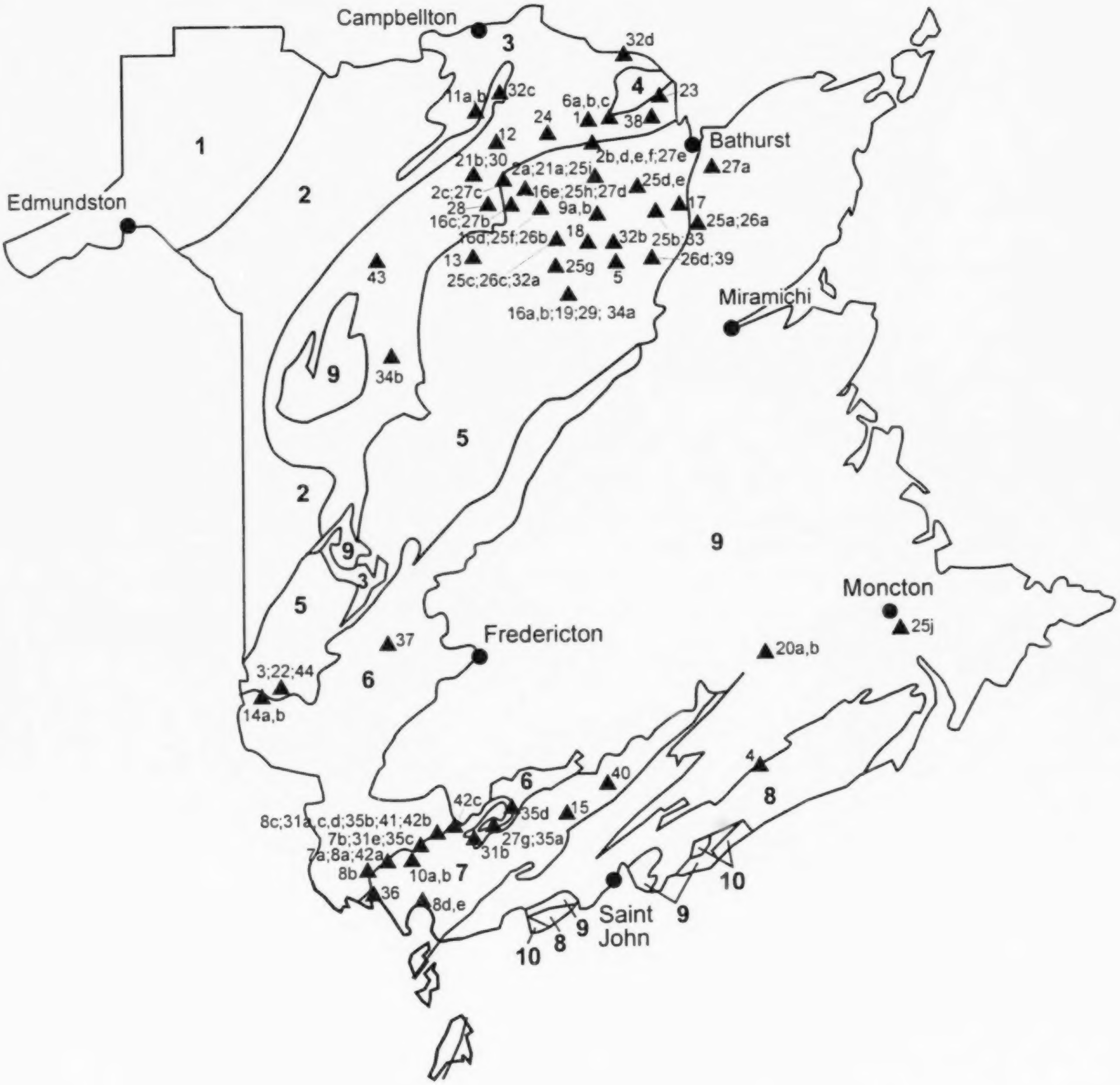

Campbellton
Edmundston
Bathurst
Miramichi
Moncton
Fredericton
Saint John
1
2
3
4
5
6
7
8
9
10
32d
23
11a,b
32c
6a,b,c
24
1
38
12
2b,d,e,f;27e
27a
21b;30
2a;21a;25i
25d,e
2c;27c
16e;25h;27d
28
9a,b
17
16c;27b
25a;26a
16d;25f;26b
18
32b
25b;33
13
26d;39
25c;26c;32a
25g
5
43
16a,b;19;29; 34a
34b
3;22;44
14a,b
37
20a,b
25j
4
40
42c
35d
15
8c;31a,c,d;35b;41;42b
7b;31e;35c
27g;35a
31b
7a;8a;42a
8b
10a,b
36
8d,e

Figure 7. Location of properties for which mineral exploration reports of work were filed in 2001.

Claim Group	Geoscan No.	No. of Claims	NTS	Release Date	Description of Work
16. Hudson Bay Exploration and Development Co. Limited					
a. Clearwater Lake (Callergari, A.R.)	475455	16	21 O/01W	Sept. 04, 2003	Grid establishment; magnetometer and electromagnetic surveys.
b. Kenny Lake	475457	140	21 O/01W	Sept. 04, 2003	Grid establishment; magnetometer and electromagnetic surveys.
c. Mount Baird East	475456	9	21 O/07E	Sept. 04, 2003	Grid establishment; magnetometer and electromagnetic surveys.
d. Mount Ganong	475443	58	21 O/08W	July 23, 2003	Grid establishment; magnetometer and electromagnetic surveys.
e. Mount Perley	475442	22	21 O/08W	July 23, 2003	Grid establishment; magnetometer and electromagnetic surveys.
17. Hunter Brook Holdings Ltd.					
Key Anacon Mine	475478	83	21 P/05E	Oct. 15, 2003	Collection and analysis of soil and water samples, reclamation work.
18. Johnston, Anthony					
Stratmat	475470	19	21 O/08E	Oct. 16, 2003	Grid establishment; prospecting; collection and analysis of soil samples.
19. Johnston, Delbert					
Clearwater–Hubbards Pond	475473	16	21 O/01W	Oct. 19, 2003	Grid establishment; prospecting; collection and analysis of soil and rock geochemical samples.
21. Log House Construction Ltd.					
a. South Branch Middle River	475487	11	21 O/09E	Nov. 02, 2003	Prospecting; trenching; collection and analysis of soil and rock geochemical samples.
22. Marr, Pat					
Springfield	475467	18	21 G/13E	Oct. 12, 2003	Grid establishment; magnetometer and very low frequency electromagnetic surveys.
25. Noranda Inc.					
a. Bruce Siding	475411	40	21 P/05E	Mar. 08, 2003	Grid establishment; magnetic, very low frequency and gravity surveys; diamond drilling.
b. Brunswick	475483	263	21 P/05W	Nov. 22, 2003	Diamond drilling; collection and analysis of rock assay and lithogeochemical data.
c. Half Mile Lake South/ Half Mile Lake Central	475386	52	21 O/08W	Jan. 16, 2003	Down-hole geophysics; diamond drilling; collection and analysis of assay and lithogeochemical samples.
d. Loop Road	475425	135	21 P/12W	Apr. 04, 2003	Down-hole geophysics; diamond drilling; collection and analysis of soil, till and lithogeochemistry samples.

Claim Group	Geoscan No.	No. of Claims	NTS	Release Date	Description of Work
e. Loop Road	475482	135	21 P/12W	Nov. 19, 2003	Grid establishment; collection and analysis of till and rock samples; diamond drilling.
f. Mount Fronsac–Fly Tent Brook	475388	30	21 O/08W	Jan. 17, 2003	Grid establishment; diamond drilling; very low frequency, horizontal-loop electromagnetic, magnetometer, gravity and pulse electromagnetic surveys; collection and analysis of assay samples.
g. Northwest Miramichi	475445	31	21 O/08W	July 27, 2003	Collection and analysis of soil and core assays and lithogeochemical samples; diamond drilling.
h. Portage Brook North	475476	86	21 O/08W	Oct. 25, 2003	Grid establishment; Max-Min, time-domaine electromagnetic, very low frequency and magnetometer surveys; diamond drilling.
i. South Middle River	475471	47	21 O/09E	Oct. 16, 2003	Grid establishment; diamond drilling; analysis of lithogeochemical samples.
26. Noranda Mining and Exploration Inc.					
a. Bruce Siding	475418	354	21 P/05E	Mar. 27, 2002	Grid establishment; magnetometer and down-hole pulse electromagnetic surveys; collection and analysis of assay and lithogeochemistry samples; diamond drilling.
b. Devil's Elbow	475446	68	21 O/08W	Aug. 09, 2003	Diamond drilling.
c. Halfmile Lake North/ Mattagami	475395	18	21 O/08W	Jan. 31, 2003	Diamond drilling; compilation; collection and analysis of assay data; down-hole geophysics.
d. Tozer Brook	475484	44	21 P/05W	Nov. 22, 2003	Diamond drilling.
27. Northeast Exploration Services Limited					
b. Mount Baird North	475432	51	21 O/07E	June 18, 2003	Grid establishment; geologic mapping; magnetometer and electromagnetic surveys; collection and analysis of assay and lithogeochemical samples; diamond drilling.
c. Restigouche Project	475452	4	21 O/07E	Aug. 29, 2003	Grid establishment; gravity and max-min surveys.
d. Tower North	475448	10	21 O/08W	Aug. 29, 2003	Prospecting; geologic mapping; collection of soil samples.
e. Wildcat	475434	36	21 O/09E	June 28, 2003	Grid establishment; induced polarization survey.
f. Wildcat	475447	36	21 O/09E	Aug. 21, 2003	Diamond drilling.

Claim Group	Geoscan No.	No. of Claims	NTS	Release Date	Description of Work
29. PGE Resource Corporation					
Bills Lake	475383	98	21 O/01E	Jan. 04, 2003	Grid establishment; gravity and Mise-a-la-masse surveys; diamond drilling; collection and assay of drill core.
32. Ross, Frank					
a. Caribou Lake	475493	13	21 O/08W	Dec. 06, 2003	Grid establishment; trenching; geologic mapping; magnetometer and very low frequency surveys; collection and analysis of soil and rock geochemical samples.
b. Ross/Lanteigne	475465	1	21 O/08E	Oct. 01, 2003	Prospecting; overburden drilling; collection and chemical analysis of till samples.
33. Ross, Frank and Donovan, Robert					
Tiger	475466	4	21 P/05W	Oct. 01, 2003	Grid establishment; prospecting; collection and geochemical analysis of soil and rock samples.
34. Slam Exploration Ltd.					
a. Clearwater Lake	475444	69	21 O/01W	July 26, 2003	Grid establishment; prospecting; trenching; collection and analysis of lithogeochemical samples.
39. Stratabound Minerals Corp.					
CNE West	475409	18	21 P/05W	Mar. 05, 2003	Grid establishment; geologic mapping; induced polarization survey; collection and analysis of lithogeochemical samples; compilation.
44. Watters, Sheila					
Deadwater Brook	475392	16	21 G/13E	Jan. 25, 2003	Grid establishment; collection and analysis of till and bark samples.
TOBIQUE–CHALEUR BELT					
1. Black, Joey					
Tetagouche	475475	6	21 O/09E	Oct. 23, 2003	Prospecting; collection of rock and soil geochemical samples.
6. Elmtree Resources Ltd.					
a. Sormany East	475479	6	21 O/09E	Nov. 14, 2003	Prospecting; trenching; geologic mapping; collection and analysis of assay data.
b. Sormany West Group B	475458	7	21 O/09E	Sept. 05, 2003	Grid establishment; trenching; geologic mapping; collection and analysis of assay samples.
c. Sormany South	475460	12	21 O/09E	Sept. 10, 2003	Prospecting; trenching; geologic mapping; collection and analysis of assay samples.
11. Gallant, Gilles					
a. Popelogan	475390	4	21 O/15E	Jan. 23, 2003	Prospecting; claim staking; collection of rock samples.

Claim Group	Geoscan No.	No. of Claims	NTS	Release Date	Description of Work
b. Popelogan	475391	23	21 O/10E	Jan. 23, 2003	Prospecting; claim staking; collection of rock samples.
12. Giroux, Ronald Lee					
Mat Fred	475387	3	21 O/15E	Jan. 17, 2003	General prospecting; rock sampling.
21. Log House Construction Ltd.					
b. Malachite	475384	14	21 O/10E	Jan. 04, 2003	Trenching; very low frequency survey; collection and analysis of soil rock and silt samples; packsack drilling.
23. Nicon Holdings Ltd.					
Nigadoo North	475488	13	21 P/13W	Nov.23, 2003	Grid establishment; gravity survey; overburden drilling; collection and analysis of soil samples.
24. Noel, Lorenzo					
Rainbow Grid	475427	2	21 O/09W	Apr. 24,2003	General prospecting; very low frequency electromagnetic survey.
28. O'Neil, David					
County Line	475428	51	21 O/07E	May 07, 2003	General prospecting; collection and analysis of rock samples.
30. Phelps Dodge Corp. of Canada Ltd.					
Ramsey Brook	475403	36	21 O/10E	Feb. 14, 2003	Grid establishment; very low frequency and magnetometer surveys.
32. Ross, Frank					
c. Hornet	475453	3	21 O/15E	Aug. 29, 2003	Grid establishment; prospecting; magnetometer and VLF surveys; collection and analysis of lithogeochemical samples.
d. Silver Fox	475469	2	21 P/13W	Oct. 15, 2003	Grid establishment; prospecting; collection and chemical analysis of soil and rock samples.
34. Slam Exploration Ltd.					
b. Lewis Brook	475419	38	21 J/14E	Mar. 27, 2003	Grid establishment; trenching and stripping; collection and analysis of soil, rock and core lithogeochemistry and assay data.
38. Stewart, Ralph					
Beresford Copper	475396	8	21 P/12W	Feb. 01, 2003	Grid establishment; very low frequency electromagnetic survey.
43. Vencan Gold Corporation					
Bald Peak	475404	45	21 O/03E	Feb. 16, 2003	Prospecting; geologic mapping; back-pack drilling; sample assaying.

Claim Group	Geoscan No.	No. of Claims	NTS	Release Date	Description of Work
FREDERICTON ZONE					
7. English, Perry					
a. Clarence Ridge	475421	36	21 G/06E	Mar. 27, 2003	Prospecting; collection and analysis of soil and grab samples.
b. Pomeroy	475420	26	21 G/07W	Mar. 27, 2003	Prospecting; collection and analysis of soil and grab samples.
8. Fenety, Peter					
a. Rollingdam	475398	16	21 G/06E	Feb. 02, 2003	Prospecting; collection and analysis of soil samples.
b. Tower Hill	475401	7	21 G/06E	Feb. 07, 2003	Prospecting; collection and analysis of soil samples.
c. True Hill	475481	4	21 G/07W	Nov. 19, 2003	Prospecting; collection and analysis of soil samples.
10. Freewest Resources Canada Inc.					
a. Clarence Stream	475433	246	21 G/07W	June 19, 2003	Diamond drilling; analysis of drill core.
b. Clarence Stream	475464	310	21 G/07W	Sept. 24,2003	Diamond drilling; analysis of drill core.
27. Northeast Exploration Services Limited					
g. Deer Lake	475424	25	21 G/07E	Mar. 29, 2003	Compilation; prospecting; geological mapping.
31. Pro-Max Resources Inc.					
a. Kedron Stream	475399	19	21 G/07W	Feb. 05, 2003	Prospecting; collection and analysis of soil and grab samples.
b. Little McDougall Lake	475492	17	21 G/07E	Dec. 04, 2003	Grid establishment; prospecting; collection and analysis of soil and grab samples.
c. Piskahegan East	475400	9	21 G/07W	Feb. 05, 2003	Prospecting; collection and analysis of soil and grab samples.
d. Piskahegan West	475397	12	21 G/07W	Feb. 02, 2003	Prospecting; collection and analysis of soil and grab samples.
e. Pleasant Ridge	475408	14	21 G/07W	Feb. 23, 2003	Prospecting; collection and analysis of soil and grab samples.
35. Southfield Resources Ltd.					
a. Logans Mountain	475491	14	21 G/07E	Dec. 04, 2003	Grid establishment; prospecting; collection and analysis of soil and grab samples.
b. Piskahegan South	475480	13	21 G/07W	Nov. 19, 2003	Grid establishment; prospecting; collection and analysis of soil and grab samples.

Claim Group	Geoscan No.	No. of Claims	NTS	Release Date	Description of Work
c. Pomeroy	475407	6	21 G/07W	Feb. 23, 2003	Propsecting; collection and analysis of soil and grab samples.
d. Sand Brook	475489	9	21 G/07E	Nov. 26, 2003	Grid establishment; prospecting; collection and analysis of soil samples.
37. Stewart, Merton					
Springfield	475477	9	21 J/03E	Oct. 25, 2003	Grid establishment; prospecting; collection and analysis of soil and rock samples.
41. Thorn, Raymond					
Beech Hill	475402	8	21 G/07W	Feb. 12, 2003	Prospecting; collection and analysis of soil and grab samples.
42. Union Gold Inc.					
a. Birney, Birney Lake, Stevenson Hill, Craig Lake	475413	109	21 G/06E	Mar. 09, 2003	Grid establishment; prospecting; collection and analysis of soil samples.
b. Pleasant West	475412	29	21 G/07W	Mar. 09, 2003	Grid establishment; prospecting; collection and analysis of soil samples.
c. 785 Group	475417	31	21 G/07W	Mar. 09, 2003	Grid establishment; collection and analysis of soil samples.
PASSAMAQUODDY ZONE					
8. Fenety, Peter					
d. Digdeguash	475459	5	21 G/02W	Sept. 07, 2003	Collection of soil samples; scanning electron microprobe studies; reflagging boundary lines.
e. Digdeguash	475472	5	21 G/02W	Oct. 17, 2003	Analysis of soil samples.
15. Hattie, Don W.					
McKeel Lake	475385	4	21 G/08E	Jan. 15, 2003	Grid establishment; prospecting; very low frequency electromagnetic survey.
36. Stevens, Dave					
Waweig	475406	4	21 G/03E	Feb. 23, 2003	Collection and analysis of soil samples; prospecting.
40. Taylor, Bruce					
Evandale	475410	13	21 G/09E	Mar. 05, 2003	Geological mapping and prospecting; collection and analysis of grab samples.
MARITIMES BASIN					
4. Cushnie, Wells					
Random	475463	5	21 H/11W	Sept. 13, 2003	Excavation of one pit.

Claim Group	Geoscan No.	No. of Claims	NTS	Release Date	Description of Work
20. Lafarge Canada Inc.					
a. Springhill	475440	6	21 I/03W	July 19, 2003	Geological mapping; collection and anlysis of grab samples; diamond drilling; analysis of core samples.
b. Springhill	475441	17	21 I/03W	July 19, 2003	Geological mapping; diamond drilling; analysis of core samples.
25. Noranda Inc.					
j. Lower Coverdale	475430	194	21 I/02E	May 25, 2003	Diamond drilling; analysis of core samples.

INDUSTRIAL MINERALS

Exploration and development activity related to New Brunswick's industrial rock and mineral resources continued at a respectable pace throughout 2001. In general, expansion was underway at some existing production facilities, steady production reported at others, while new operations were being established to supply new products for both local and export markets. In addition, a few exploration initiatives and related development opportunities were being considered in both the northern and southern parts of the province.

Limestone, Dolomite, Gypsum

Three major players and the recent addition of a couple of enterprises in the startup or early development phase characterize the province's limestone industry. In 2001, Elmtree Resources Ltd., the only producer of limestone related products in northern New Brunswick, concentrated on extending its quarry operation at their Sormany site (see Figure 9 in Chapter 3), 35-40 km west of Bathurst, and began exploring an interesting dolomite property a few kilometres east of its operation (Figure 6: 36).

Lafarge Canada Inc. undertook a mapping and limited drilling project on its Springhill claims (Figure 6: 37), 5 km southwest of the company's Havelock operation.

A few kilometres west of Lafarge is the calcined lime and related limestone-processing facility of Graymont (NB) Inc., formerly Havelock Lime. Graymont continued quarry operations at Lafarge's McGee quarry (see Figure 9 in Chapter 3) and is in the process of expanding it to the west. Graymont has also committed to establish a new quarry site a few kilometres north of its Havelock processing facility (Figure 6: 38). Similar to Lafarge, Graymont also benefited from the Fredericton to Moncton highway project, providing between 1 800 000 to 2 000 000 t of aggregate material from rock overlying the high-calcium limestone at its Samp Hill quarry site.

Two new limestone development initiatives were reported in 2001. Plaster Rock Gypsum and Manufacturing Limited is in the early stages of developing a small limestone property a few kilometres south of the village of Plaster Rock in northwestern New Brunswick (Figure 6: 39). Another is the newly established quarry operation of Kingsway Materials Ltd., situated 25 km east of Saint John (Figure 6: 40).

A pending development announced late in 2001, that could have considerable impact the province's limestone industry is the apparent interest by NB Power in seeking a supply of limestone for a refurbished Coleson Cove Generating Station (see Figure 9 in Chapter 3), 15 km west of Saint John, beginning as early as 2004. NB Power is in the process of evaluating the merits of converting the present Coleson Cove fuel source for this station to an orimulsion fuel. The proposed refurbishment project would involve the installation of a flue gas desulphurization unit utilizing between 200 000 and 300 000 t of limestone annually to reduce atmospheric sulphur emissions.

Last year was an interesting one for gypsum in the Province. Production was quite limited but more importantly a mining lease was approved for Plaster Rock Gypsum and Manufacturing in northwestern New Brunswick. The company intends to supply agricultural gypsum initially to markets in northwestern New Brunswick and northeastern United States. Another gypsum development initiative submitted by Mactaquac Mining for its Demoiselle property near Albert Mines in southeastern New Brunswick (Figure 6: 41) was proceeding through the mining lease approval process.

Aggregate

On the construction and related materials side, exploration and development of the Province's aggregate resources continued at record levels throughout the year. Although much of this relates to the construction of the natural gas pipeline and a new 195 km four-lane highway in southern New Brunswick, considerable interest has been shown in exporting aggregate materials from the Province's ports.

Over the last three to four years, the primary construction phase of the highway project has resulted in the consumption of approximately 8 500 000 t of rock, gravel and sand. In addition, many tonnes of high-quality aggregate materials went into1 500 000 t of asphalt and 57 000 m^3 of concrete. A major project involving the completion of a 128 km section four-lane highway north of Fredericton to the Quebec border is presently under discussion between various government agencies. Should this construction project proceed, considerable aggregate material will be required.

The export of New Brunswick aggregate materials has become a major industry, with shipments reaching a record level in 2001. Interest continued in expanding aggregate exports from the Port of Bayside in southwestern New Brunswick. It is suggested that, under favourable conditions, other sites in New Brunswick have potential as aggregate exporters, particularly adjacent to the Port of Belledune in northern New Brunswick (see Figure 9 in Chapter 3).

Stone

A few interested parties are examining exploration and potential development initiatives of natural stone. Maritime Stone Works Inc. near Moncton is looking at expanding quarry operations to the Miramichi area.

Canadian Landscape Granite has been fairly active in southwestern New Brunswick in 2001, having applied for several quarry leases in the region including a former red granite quarry situated on Crown land, north of Saint George. This company is considering producing and marketing several types of crushed and related granite stone products for ornamental and related uses from existing piles of quarry waste rock at this quarry and establishing small extraction operation at a few other Crown land sites throughout the region.

Potash

The Potash Corporation of Saskatchewan (New Brunswick Division) increased its property holdings near its Sussex area mine and processing facility (see Figure 9 in Chapter 3) as a result of preliminary drilling associated with defining a natural gas resource on the company's existing mining lease. PCS(NB) plans to conduct a more detailed assessment of the potash resource in this area.

Kaolin

Recent fossil evidence from Atlantic Silica's Cassidy Lake deposit of unconsolidated quartz pebbles, sand and kaolinitic clay (see Figure 9 in Chapter 3), 25 km south of Sussex, indicates that the deposit is of Cretaceous age and may be part of a hidden Cretaceous basin, similar to those found in Nova Scotia that are often associated with significant kaolin resources.

Peat

Nine new applications for peat exploration licences on Crown lands were received in 2001: Peatlands 340, 341 and 342A by Donald Doucet; Peatland 343 by Adrien Chiasson; Peatland 575 by Jeanne-Mance Larocque; Peatland 4 by Sun Gro Horticulture Canada Ltd.; Peatland 356 by Le Groupe Berger ltée; Peatland 44 by Premier Horticulture (Premier Tech ltée); Peatland 39 by Compagnie de tourbe Fafard ltée.

Three new Peat Exploration Licences were issued in 2001: Licence 2001-1 for Peatland 356 to Le Groupe Berger ltée; Licence 2001-2 for Peatland 44 to Premier Horticulture (Premier Tech ltée); and Licence 2001-3 to Compagnie de tourbe Fafard ltée for Peatland 39.

Peat Exploration Licence 99-1 issued to Groupe-Qualité Lamèque ltée for Peatland 25 lapsed after its maximum two-year term expired.

Since May 1999, all new applications received have been placed on hold pending the finalization of a government review of provincial policies concerning the peat industry. The new policy on Peat Mining was announced by the Minister of Natural Resources and Energy in November 2001. All peat exploration licences that were placed on hold are being evaluated as per the terms of the new policy.

Le Groupe Berger ltée

COMPANY Le Groupe Berger ltée, 121, R.R. #1, St-Modeste (Québec) G0L 3W0. The President is Claudin Berger. Telephone: (418) 862-4462. The contact person is Andreas Avenriep. Telephone : (506) 228-9801.

RIGHTS Peat Exploration Licence 2001-1 (183 ha) on Peatland 356, under the *Quarriable Substances Act*, Chapter Q-1.1, S.N.B. 1991.

LOCATION Peatland 356 is located 3 km west of Eel River Bridge, just east of the company's current operation in Bay du Vin, Northumberland County (Figure 6: 42).

History Le Groupe Berger ltée had been issued an option in 1999. It applied for a peat exploration licence in July 2001 that was issued in October of the same year.

Reserves and Grade An estimated 3.06 Mm^3 surficial peat; average depth 2.4 m; average humification 3.2 von Post.

Premier Horticulture (Premier Tech ltée)

Company Premier Horticulture, 1, avenue Premier, C.P. 2600, Rivière-du-Loup (Québec). Telephone: (418) 862-6356. The contact person is Michel Vachon, Director of Operations.

Rights Peat Exploration Licence 2001-2 (545 ha) on Peatland 44, under the *Quarriable Substances Act*, Chapter Q-1.1, S.N.B. 1991.

Location Peatland 44 is located 33 km east of Chipman in Queens County (Figure 6: 43).

History Premier Horticulture, a business unit of Premier Tech ltée, had been issued an option in 1996. It applied for a peat exploration licence in August 2001 that was issued in November of the same year.

Reserves and Grade An estimated 8.63 Mm^3 surficial peat; average depth 2.6 m; average humification 3.2 von Post.

Compagnie de Tourbe Fafard ltée

Company Compagnie de Tourbe Fafard ltée, 422, chemin Pallot, Inkerman, New Brunswick E8P 1B5. Telephone: (506) 336-9715. The Manager is Denis Mallet.

Rights Peat Exploration Licence 2001-3 (272 ha) on Peatland 39, under the *Quarriable Substances Act*, Chapter Q-1.1, S.N.B. 1991.

Location Peatland 39 is located 5 km west of the company's current operation at Birch Ridge, northwest of Moncton, in Kent County. (Figure 6: 44).

History Compagnie de Tourbe Fafard ltée held an option on Peatland 39 since 1996. The company applied for a peat exploration licence in October 2001 that was issued in November of the same year.

Reserves and Grade 4.85 Mm^3 surficial peat; average depth 2.6 m; average humification 3.0 von Post.

Jiffy Products (N.B.) Ltd.

Company Jiffy Products (N.B.) Ltd., C.P. 2004, Parc industriel, Shippagan, N.B. E8S 3H1. The Manager is Alonzo Dupuis. Telephone: (506) 336-2284.

Right Peat Lease No. 32 (268 ha) on Peatland 536 under the *Quarriable Substances Act*, Chapter Q-1.1, S.N.B. 1991.

LOCATION Peatland 536 is located 8 km north of Tracadie-Sheila, between Pont-Landry and Ste-Rose, Gloucester County (Figure 6: 45).

HISTORY Jiffy Products (N.B.) Ltd., a subsidiary of Jiffy Products International, Oslo, Norway, established a peat pot and pellet manufacturing plant in Shippagan in 1975. In 1982, the company was issued a Peat Exploration Licence for Peatland 536. A Peat Lease was granted in 1989 to guarantee a long-term supply of quality peat moss for the manufacturing plant.

RESERVES AND GRADE 5.64 Mm^3 surficial peat; average depth 2.6 m; average humification 3.4 von Post.

DEVELOPMENT No new development. Peatland 536 is considered a reserve for future needs.

HYDROCARBONS AND UNDERGROUND STORAGE

Oil and Natural Gas

Corridor Resources Inc.

COMPANY Corridor Resources Inc., Suite 301, 5475 Spring Garden Road, Halifax, Nova Scotia B3J 3T2.

RIGHTS Oil and Natural Gas On-shore Licence to Search 95-02 (35 165.3 ha), 95-03 (15 774.0 ha), 95-04 (20 072.4 ha), 95-05 (7762.9 ha), 97-02 (11 883 ha). 97-03 (35 930 ha), 97-04 (17 950 ha), 98-09 (18 005 ha), 98-10 (17 980 ha), 01-06 (17 980 ha), 01-07 (15 123 ha) and 01-08 (10 094.4 ha) under the *Oil and Natural Gas Act*, Chapter O-2.1, R.S.N.B. 1976.

LOCATION Licences 95-02 [2329]*, 95-03 [2229], 95-04 [2230] and 95-05 [2330] are in the Dorchester to Port Elgin area (Figure 6: 46a) of Westmorland County (NTS 21 I/1, 21 H/16). Licences 97-02 [2426], 97-03 [2326], 97-04 [2325], 98-09 [2425] and 98-10 [2325] are in the Moncton Subbasin between Moncton and Sussex (Figure 6: 46b) in Kings, Westmorland and Albert counties (parts of NTS 21 H/13, 14, 15, 16; 21 I/01, 02). Licences 01-06 [2324], 01-07 [2424] and 01-08 [2424] located north and west of Sussex in Queens and Kings counties (NTS 21 H/12; Figure 46c).

HISTORY Corridor entered into two farmout agreements, first with Globex Resources Ltd., a Calgary-based junior exploration company on three licences to search ONG 01-06, ONG 01-07 and ONG 01-08 covers some 43 000 ha. Second, a farmout agreement with EOG Resources Canada Inc. a company based in Calgary, will result in EOG operating certain of Corridor's 49 000 ha interest on licences to search ONG 98-09, ONG 98-10, and ONG 01-04 in the McCully natural gas discovery area. Corridor and joint venture partner PCS, following the discovery of natural gas at McCully, 11 km northeast of Sussex, spudded three additional wells. A directional stepout, Corridor/PCS McCully 2/A-67-2425/P-66 (ONG 98-09) was drilled from the same pad as the discovery well. Also, two delineation wells, Corridor/PCS McCully P-56-2425 (ONG 98-09) and C-75-2425 (ONG 01-04), were completed 2.2 km to the southeast and 4.5 km to the southwest of the discovery well, respectively. Corridor was granted geophysical licences and permits for two surveys totaling 146 km of reflection seismic. The survey locations are in the Millstream and McCully areas. Late in the year well licences were issued for Corridor Globex Case Settlement C-82-2424 (ONG 01-08) and EOG Corridor McCully D-48-2425 (ONG 98-09).

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* Numbers in square brackets [2329] are Grid Index Numbers. See p. 24.

The company submitted successful a bid in Call for Tenders #16; licences 01-06, 01-07, and 01-08 were granted January 26, 2001.

OUTLOOK The McCully wells intersected significant natural gas; delineation wells and additional seismic are planned.

Irving Oil Limited

COMPANY Irving Oil Limited, P.O. Box 1421, Saint John, New Brunswick E2L 4K1.

RIGHTS Oil and Natural Gas On-shore Lease 74-1 (2153.7 ha), under the *Oil and Natural Gas Act*, Chapter O-2.1, R.S.N.B. 1976.

LOCATION Lease 74-1 [2328], in the Stoney Creek field (Figure 6: 47), is 16 km south of Moncton in Albert County (NTS 21 H/15).

HISTORY Lease 74-1 is in the eighth year of the third ten-year term. There has been no oil production from the field since 1988 and no natural gas production since 1991.

OUTLOOK The company permitted portions of seismic lines over Stoney Creek field to be released from confidentiality. The reflection seismic was shot by Chevron Canada Resources Ltd. in the early 1980s.

Jean Mariadassou

COMPANY Jean Mariadassou, Suite 304, 7100 Bombardier, Anjou, Québec H1H 2G2.

RIGHTS Oil and Natural Gas On-shore Licence to Search 97-01 (10 522 ha) under the *Oil and Natural Gas Act*, Chapter O-2.1, R.S.N.B. 1976.

LOCATION The licence area 97-01 [1515] is in northwestern New Brunswick, just northeast of St. Leonard (Figure 6: 48) in Madawaska County (NTS 21 O/04, 05).

HISTORY The Notre Dame de Lourdes #1 well was deepen to 670 m.

OUTLOOK The licensee continues to examine geological data.

Columbia Natural Resources Canada, Ltd.

COMPANY Columbia Natural Resources Canada, Ltd., 65 Regent Street, Suite 220, Fredericton, New Brunswick E3B 7H8.

RIGHTS Oil and Natural Gas On-shore Licence to Search 97-05 (35 823 ha), 97-06 (35 823 ha), 97-07 (17 898 ha), 97-08 (35 717 ha), 97-09 (35 717 ha), 98-01 (34 593 ha), 98-02 (35 930 ha), 98-03 (25 155 ha), 98-04 (10 779 ha), 98-05 (10 746.9), 98-06 (19 336 ha), 98-07 (35 717 ha), 98-08 (15 352.9 ha), 01-01 (23,219.8 ha), 01-02 (8,946.1 ha), and Oil and Natural Gas Lease 01-02 (33 411.5 ha) under the *Oil and Natural Gas Act*, Chapter O-2.1, R.S.N.B. 1976.

LOCATION Lease area 01-02 [2327], located 10–20 km south of Moncton in the Turtle Creek area (Figure 6: 49a) of Albert County (NTS 21 H/15), is immediately west and along strike of the previously productive Stoney Creek oil and gas field. Licences 97-05 [2225], 97-06 [2226], 97-07 [2227], 97-08 [2127], and 97-09 [2126] are located north and west of Moncton (Figure 6: 49b) in the counties of Albert, Kings, Kent, Queens and Westmorland. Licences 98-01 [2420], 98-02 [2322], 98-03 [2321], 98-04 [2320], 98-05 [2221], 98-06 [2222], 98-07 [2122], and 98-08 [2121] are located northeast, east and south of Fredericton (Figure 6: 49c) in Sunbury and York counties. Licences 01-01 [2128] and 01-02 [2228] are located northeast of Moncton in Kent and Westmorland counties (Figure 6: 49d).

HISTORY Columbia Natural Resources Canada, Ltd. (CNRC), a Fredericton-based company, operated all the former lands held by MariCo Oil and Gas Corporation in the Marysville, Moncton, Sackville subbasins as well as the Cocagne Graben. The company continued exploration with active drilling and geophysical programs. The drilling in the Monteagle area (ONG 97-06) resulted in completing the work on Columbia Monteagle G-56-2226 and J-67-2226 wells spudded late in the previous year. Two additional wells, Columbia *et al.* Monteagle A-47-2226 and L-18-2226, were licenced and drilled. CNRC was issued geophysical licences and a permit for three surveys totaling 110 km of 2-D reflection seismic. The survey locations are in Sackville, Marysville and North Cocagne areas.

CNRC and Corridor joint-ventured in drilling a well, Columbia/Corridor Copper Mine Hill 2/F-88-2329 (ONG 95-02), northwest of Sackville. The companies have 50% interest in licences to search ONG 95-02, ONG 95-03, ONG 95-04, ONG 95-05, ONG 97-02 and ONG 97-03 located in the Sackville and Moncton subbasins, southeast and southwest of Moncton, respectively.

The company submitted a successful bid in Call for Tenders #16; licences 01-01 and 01-02 were granted on April 23, 2001. Also, the former licence to search 93-02 (33 411.5 ha) was converted to lease 01-02 at the end of term.

OUTLOOK The company initiated a production test on five oils wells in the late spring: Albert Mines L-44-2328, Albert Mines H-55-2328, Taylor Village J-27-2328, Taylor Village C-27-2328 and Boudreau A-36-2328.

J.A. Seglund Inc.

COMPANY J.A. Seglund Inc., 9825 Ana Hula St., Diamond Head, Mississippi, U.S.A. 39525-4400.

RIGHTS Oil and Natural Gas On-shore Licence to Search 95-01 (8990.5 ha) and Oil and Natural Gas On-shore Leases 99-01 (359.4 ha), 99-02 (1436.2 ha), 99-03 (717.8 ha), 99-04 (1077.0 ha) and 01-01 (10 057.1 ha) under the *Oil and Natural Gas Act*, Chapter O-2.1, R.S.N.B. 1976.

LOCATION The one licence 95-01 [2328] and five leases 99-01 [2328], 99-02 [2328], 99-03 [2328], 99-04 [2328] and 01-01 [2328] are about 15 km south of Moncton in the Albert Mines to Saint-Joseph area, on both sides of the Petitcodiac and Memramcook rivers (Figure 6: 50) in Albert and Westmorland counties, respectively (NTS 21 H/15).

HISTORY A farmout agreement with Columbia (see above) resulted in a number of wells being drilled in both licence and lease agreement areas. The company converted the former licence to search 93-01 (10 057.1 ha) to lease 01-01 at the end of term.

OUTLOOK The company and the operator continue to evaluate the extent and potential of the pool.

RHT Enterprises Ltd.

COMPANY RHT Enterprises Ltd., 69 Biddington Ave., Lakeville, Westmorland County, New Brunswick E1H 1C2.

RIGHTS Oil and Natural Gas On-shore Lease 00-01 (2146.0 ha) under the *Oil and Natural Gas Act*, Chapter O-2.1, R.S.N.B. 1976.

LOCATION The lease area 00-01 [2128, 2228] is northeast of Moncton between Lakeville and Cocagne (Figure 6: 51) in Westmorland County (NTS 21 I/02).

HISTORY The lease was converted at the end of the eight-year term from two licences issued in January 1992 to Lakeside Estates Ltd. and later transferred to RHT Enterprises Ltd. of Moncton. The company drilled one dry hole with a second hole, RHT Lakeside No. 2, suspended.

OUTLOOK The company intends to re-enter RHT Lakeside #2 and complete the well when adequate funding can be secured.

Potash Corporation of Saskatchewan Inc.

COMPANY Potash Corporation of Saskatchewan Inc., P.O. Box 5039, Sussex, New Brunswick E4E 5L2.

RIGHTS Oil and Natural Gas On-shore Licence to Search 01-03 (9 015.5 ha) under the *Oil and Natural Gas Act*, Chapter O-2.1, R.S.N.B. 1976.

LOCATION The licence area 01-03 [2424] is west and southwest of Sussex in Kings County (NTS 21 H/12; Figure 6: 52).

HISTORY The company was granted the licence on January 11, 2001.

OUTLOOK The company will undertake to review and update available geological and geophysical information for the area.

Corridor Resources Inc./ Potash Corporation of Saskatchewan Inc.

COMPANY Corridor Resources Inc., Suite 301, 5475 Spring Garden Road, Halifax, Nova Scotia B3J 3T2.

Rights Oil and Natural Gas On-shore Licence to Search 01-04 (14 784 ha) under the *Oil and Natural Gas Act*, Chapter O-2.1, R.S.N.B. 1976.

Location The licence area 01-04 [2425] is east of Sussex in Kings County (NTS 21 H/11; Figure 6: 53).

History Corridor partnered with Potash Corporation of Saskatchewan Inc. in Call for Tenders #16. The joint venture partnership, with Corridor named as addressee for service, acquired licence 01-04 on January 26, 2001.

Outlook The company will undertake to review and update available geological and geophysical information for the area.

Norton Energy Corp.

Company Norton Energy Corp., 626 Newcastle Blvd., Miramichi, New Brunswick E1V 2L3.

Rights Oil and Natural Gas On-shore Licence to Search 01-05 (11 265.7 ha) under the *Oil and Natural Gas Act*, Chapter O-2.1, R.S.N.B. 1976.

Location The licence area 01-05 [1627] is east of Miramichi in Northumberland and Kent counties (NTS 21 P/02; Figure 6: 54).

History The company was granted the licence on February 27, 2001.

Outlook The company will undertake to review and update available geological and geophysical information for the area.

Bituminous Shale

Three-D GeoConsultants Limited

Company Three-D GeoConsultants Limited, P.O. Box 3133, Station B, Fredericton, New Brunswick E3A 5G9.

Rights Bituminous Shale Licence to Search 01-01 (26 883.7 ha), under the *Bituminous Shale Act*, Chapter B-4.1, R.S.N.B. 1976.

Location Licence to search 01-01 is located south and southeast of Moncton (Figure 6: 55) in Westmorland County (NTS 21 H/15).

History The company was awarded the licence upon submission of the successful bid in Call for Tenders #17BS01. The closing date was October 23, 2001.

Outlook The company plans to drill a bituminous shale evaluation well.

Underground Storage

St. Clair Pipelines (1996) Ltd.

Company St. Clair Pipelines (1996) Ltd., 50 Keil Drive North, Chatham, Ontario N7M 5M1

Rights Underground Storage Exploration Licences 99-02 (898.5 ha) under the *Underground Storage Act*, Chapter U-1.1 R.S.N.B. 1978.

Location Licence 99-02 [2328] is in the Dorchester area (Figure 6: 56) of Westmorland County (NTS 21 H/15).

History Two three-year nonrenewable licences, 96-01 (Dorchester) and 96-02 (Point de Bute), were granted on February 23, 1996. Both licenced expired February 1999. The company applied for the Dorchester area prior to expiry and a new licence was granted for the 898.5 ha area.

Outlook The single licence of St. Clair Pipelines (1996) Ltd. is in good standing.

Intragaz

Company Intragaz, 6565, boul. Jean XXIII, Trois-Rivières-Ouest, Québec G9A 5C9.

Rights Underground Storage Exploration Licences 00-01 (628.1 ha), 00-02 (7458.7 ha), 01-01 (15 363.1 ha), 01-02 (650.4 ha), 99-01 (2 446.4 ha), and 99-03 (1 347.4 ha) under the *Underground Storage Act*, Chapter U-1.1 R.S.N.B. 1978.

Location Licence 00-01(Baie Verte) [2330], 00-02(Sackville) [2329], 01-01 (Port Elgin–Coppermine) [2328, 2329, 2229, 2230], 01-02 (Uniacke Hill) [2330], 99-01 (Jolicure) [2329, 2330], and 99-03 (Point de Bute) [2329, 2330] are located in Albert and Westmorland counties (Figure 6: 57).

History Intragaz continues to hold two of the original eight licences 00-01 and 00-02 in addition to Port Elgin–Coppermine, Uniacke Hill, Jolicure and Point de Bute areas.

Outlook The company agreements are in good standing.

Chapter 3. Mines and Quarries

PRODUCTION STATISTICS

The 2001 value of mineral production (including coal) in New Brunswick is estimated to be $789 196 489, representing an increase of 2% from the final value of $772 546 475 in 2000 (Tables 4 and 5; Figure 8). The increase was due to the improved performance of the metals sector. Higher production of zinc and lead was sufficient to overcome generally lower metal prices. Further support came from a weaker Canadian dollar, whose value averaged US 64.58¢ for the year, down 4% from the previous year, when it averaged US 67.34¢.

The value of metals production during the year was $562 325 882, representing 71% of the Province's value of mineral production. Overall, the sector was up by 8%. Noranda's Brunswick mine, the Province's sole metals producer, experienced a notable improvement in throughput and metal production. CanZinco's Caribou mine remained shut down for the third full year after low metal prices and metallurgical difficulties had forced a suspension of operations in August 1998. Zinc continued to dominate the metals sector, with a value of $429 141 263, which represents 76% of the total value of metals. The value of zinc production increased approximately 8% from 2000. This is the more remarkable as the zinc price actually fell by over 21% between 2000 (51.2¢/lb. [U.S.]) and 2001 (40.2¢/lb. [U.S]). The drop in the average exchange rate of the Canadian dollar contributed to the value of production, as expressed in Canadian currency. Lead was a secondary contributor to the improvement in metals value, as production increased by 24%, while the price increased by 5% (21.6¢/lb. [U.S.], up from 20.6¢/lb. [U.S.] in 2000). The value of copper production fell by almost 13%, to $22 239 615, on the strength of a 13% decrease in the price (71.6¢/lb. in 2001 vs 82.2¢/lb. in 2000) and a 5% decrease in production. Antimony, bismuth, and cadmium continued to be produced as by-products from the Brunswick operation. The total value of the three by-product metals increased by 22%, chiefly because of increases in both

Table 4. Value of Mineral Production* in New Brunswick, 1990 to 2001
(Source: Natural Resources Canada)

Calendar Year	Metals ($)	Nonmetals ($)	Fuels ($)	Structural Materials ($)	Total ($)
1990	584 491 926	208 784 840	37 200 000	47 449 277	877 926 043
1991	375 427 470	220 185 000	34 185 000	41 663 590	671 475 483
1992	594 174 162	243 745 074	32 200 000	38 001 869	908 121 105
1993	489 912 908	208 094 381	33 800 000	40 042 060	771 849 349
1994	543 445 558	252 225 522	28 450 000	37 923 292	862 044 372
1995	670 694 700	281 088 407	24 410 000	44 459 331	1 020 652 438
1996	586 293 968	301 627 615	24 030 000	42 731 027	954 682 610
1997	657 532 566	238 936 898	18 190 000	38 411 671	953 071 135
1998	609 944 183	188 890 558	22 850 000	41 307 613	862 992 354
1999	595 437 842	185 020 794	20 870 000	47 207 878	848 536 514
2000	520 549 200	189 360 937	22 843 000	39 793 338	772 546 475
2001(P)	562 325 882	170 390 891	19 781 000	36 698 716	789 196 489

(P) Preliminary figures; * Current dollars

Table 5. Mineral Production in New Brunswick, 2000 (F) and 2001(P)
(Source: Natural Resources Canada)

Commodity	Unit	2000 Final		2001 Preliminary	
		Quantity	Value ($)	Quantity	Value ($)
Metals					
Antimony	kg	*	*	*	*
Bismuth	kg	194 230	2 250 349	251 530	3 088 788
Cadmium	kg	169 710	90 965	211 478	160 089
Copper	kg	9 422 632	25 516 487	8 938 752	22 239 615
Gold	g	*	*	*	*
Lead	kg	64 490 165	43 466 371	79 998 184	57 998 683
Silver	kg	200 608	47 887 447	209 685	45 878 053
Zinc	kg	237 535 186	397 871 437	305 874 029	429 141 263
TOTAL			520 549 200		562 325 882
Nonmetals					
Marl	t	*	*	*	*
Peat	t	464 595	54 002 657	382 998	47 417 277
Potash	t	*	*	*	*
Quartz (silica)	t	*	*	*	*
Salt	t	*	*	*	*
Sulphur (in smelter gas)	t	109 939	7 491 212	99 607	4 251 782
TOTAL			189 360 937		170 390 891
Fuels					
Coal	t	229 300	22 843 000	164 700	19 781 000
TOTAL			22 843 000		19 781 000
Structural Materials					
Lime	t	*	*	*	*
Sand and Gravel	t	3 355 848	*	3 041 046	*
Stone	t	3 293 692	19 429 266	4 002 877	17 201 432
TOTAL			39 793 338		36 698 716
GRAND TOTAL (CDN)			$ 772 546 475		$ 789 196 489

* confidential information GRAND TOTAL 1999 (CDN $) $848 536 514 **February, 2002**

the amount and price of bismuth produced. Gold production increased by 11.2%, resulting in a net increase in value despite a 2.9% drop in the price. Despite a slight increase in production, the value of silver fell by 4% as a result of an 11% decrease in the price.

The nonmetals sector of the industry contributed $170 390 891 (22%) to the value of mineral production, a 10% drop from the 2000 value. The largest contributor to the value of nonmetals production is potash. Both the value and quantity of potash decreased from 2000 levels. In addition to the regularly scheduled shutdown,

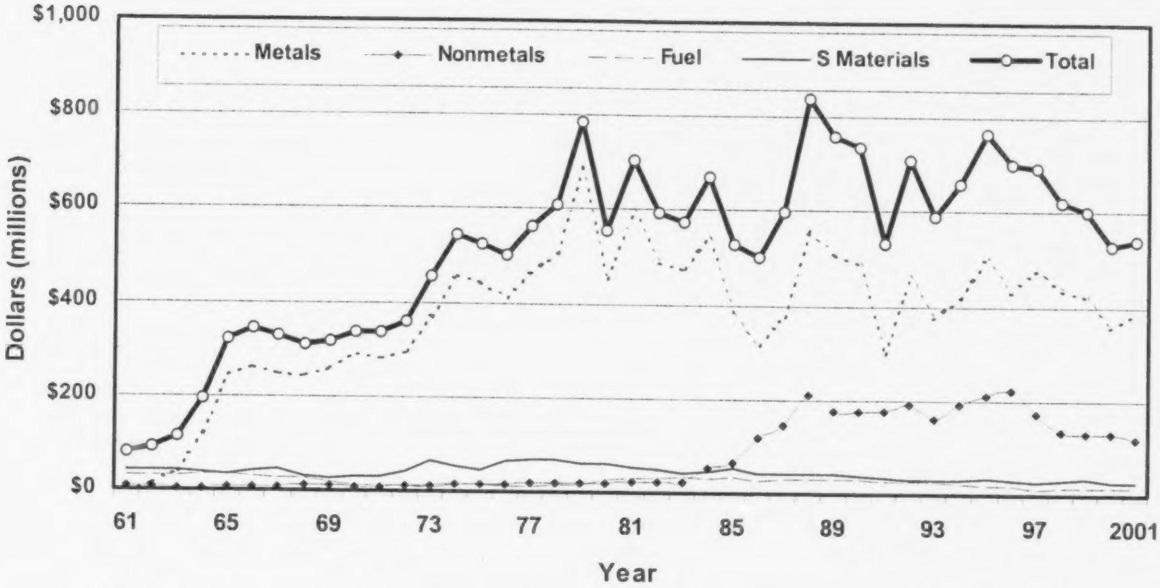

Figure 8. Value of mineral production in New Brunswick, 1961–2001, Abbreviations: S Materials – structural materials. Source: Natural Resources Canada (1986=100).

the Potash Corporation of Saskatchewan's Penobsquis mine ceased production for six weeks in November to reduce excess inventory. Peat, the second largest contributor ($47 417 277) to the value of nonmetals production, represented 28% of the sector's value. After increases in the two preceding years, both the amount and value of peat fell. Salt and sulphur in smelter gas ranked next in value of production, with quartz and marl being minor contributors to the nonmetals sector.

The value of production for structural materials (lime, stone, sand and gravel) decreased 8% to $36 698 716. Sand and gravel production was up 3%, while stone production decreased by more than 11%. These commodities provide the raw materials for the construction industry in New Brunswick.

The value of coal produced by N.B. Coal Limited in the Minto–Chipman area decreased by 13% to $19 781 000, as production fell by 28%.

New Brunswick ranks first among Canadian provinces and territories in the value of production of zinc, lead, antimony and bismuth, second in silver and peat, and third in cadmium and sulphur (in smelter gas).

EMPLOYMENT

The mineral industry employed an average of 3190 people in 2001. The following shows employment (permanent and seasonal) by sector:

Metals	1531	Peat	1071
Potash	371	Structural Materials	135
Coal	82	**Total**	**3190**

Table 6. Rank of the Provinces and Territories in Value of Production for Leading Minerals in Canada, 2001 (P)

Mineral	NF	PE	NS	NB	PQ	ON	MB	SK	AB	BC	YT	NT	NV	Total Value Canada ($000)
Antimony				1						2				516
Bismuth				1						2				3 163
Cadmium				3	2	1				4				801
Clay Products			x		x	1		x	x	x				195 217
Coal			4	5				3	2	1				1 546 798
Copper				5	3	2	4	6		1				1 520 566
Gold	8			10	2	1	4	9	11	3	7	6	5	2 112 397
Lead				1						2			3	108 336
Lime				x	x	1	x		x	x				212 435
Marl				x										x
Peat	*	*	x	2	1		x	x	*	x				167 889
Potash				x				x						1 581 526
Salt			x	x	x	1		*	*					449 508
Sand & Gravel	7	12	8	9	4	1	6	5	2	3	10	11		953 181
Silver	10			2	3	4	5	9		1	8	7	6	267 897
Stone	5		3	6	2	1	7	x	x	4		*		884 081
Sulphur (in smelter gas)				3	2	1				4				35 498
Sulphur (elemental)	x		x			x		2	1	x				1 171
Zinc				1	2	6	5	7		4			3	1 416 428

Source: Statistics Canada Catalogue 26-202

x Confidential information under the *Statistics Act of Canada*

* Unable to calculate ranking

(P) Preliminary estimate

METALLIC MINERALS

Noranda Inc.–Brunswick Mine

COMPANY Noranda Inc.–Brunswick Mine (formerly known as Noranda Mining Inc.–Brunswick Mining Division). Head Office: P.O. Box 755, Ste 4100, BCE Place, 181 Bay St., Toronto, Ontario M5J 2T3. Telephone: (416) 982-7111; Mine Office: P.O. Box 3000, Bathurst, New Brunswick E2A 3Z8; Smelter Office: P.O. Box 2000, Belledune, New Brunswick E0B 1G0. The Chief Executive Officer is Derek Pannell, the President and Mine Manager is Jean Desrosiers.

RIGHTS In 1962, Brunswick Mining and Smelting Corporation Limited was granted surface and mineral rights to the No. 12 mine property.

LOCATION Brunswick owns Canada's largest zinc deposit and operates one of the world's largest zinc mines. The company also operates a concentrator and lead smelter. The Brunswick No. 12 mine (Figure 9: 1a) is about 24 km west of Bathurst in Gloucester County (Lat. 47° 28.5' N and Long. 65° 53.5' W; NTS 21 P/5W). The concentrator is adjacent to the No. 12 mine; the lead smelter (Figure 9: 1b) is at Belledune Point, about 45 km from the No. 12 mine.

HISTORY (Early history is described in Miscellaneous Report 13, "New Brunswick's Mineral Industry, 1993.")

In the summer and fall of 2000, the mine experienced heightened seismic activity underground, which resulted in one of the main production areas (the South Block) becoming unavailable for mining. The company embarked on an intensive campaign to rehabilitate the affected area through ground control and stress relief measures. These actions proved successful and the affected zone was brought back into the mine production plan. Average 2001 ore production, at 9863 t/d, was higher than in 2000. Average grades were also higher and, in fact, the mine achieved a record fourth quarter for metals production. This good performance was achieved in spite of a five-day shutdown in December caused by production difficulties underground.

EMPLOYEES In 2001, there were, on average, 965 regular and contract employees at the mine and 552 employees at the smelter.

RESERVES Proven and probable ore reserves: 25 430 000 t grading 0.38% Cu, 8.86% Zn, 3.50% Pb, 104.2 g/t Ag.

PRODUCTION In 2001, 3 595 285 t of ore was milled.

Production	Copper	Lead	Zinc	Silver/Bulk
Grade	0.44%	3.66%	9.66%	118 g/t Ag
Recovery	55.56%	63.19%	87.52%	56.83% Ag
Concentrate	36 410 t	156 302 t	543 021 t	50 552 t bulk

The company produces zinc concentrate destined mainly for Noranda's Canadian Electrolytic Zinc refinery in Valleyfield, Québec, and a number of refineries in Europe; lead concentrate for the Belledune smelter; bulk concentrate for Europe; and a copper concentrate mainly for the Noranda smelter in Murdochville, Québec. With the announced closure in April 2002 of the Murdochville smelter, future copper concentrate deliveries will be to either the Horne smelter in Noranda, Québec, or the Kidd Creek smelter in Timmins, Ontario.

CanZinco Ltd.–Caribou Mine Division
(formerly East West Caribou Mining Limited)
Restigouche and Caribou Mines

COMPANY CanZinco Ltd., owned by Breakwater Resources Limited. The head office is 95 Wellington Street West, Suite 2000, Toronto, Ontario, M5J 2N7. The Chairman is Garth MacRae. Telephone: (416) 363-4798. The local address is P.O. Box 26, Bathurst, New Brunswick E2A 3Z1. Telephone: (506) 546-1999. The President and CEO of CanZinco Ltd. is Colin Benner.

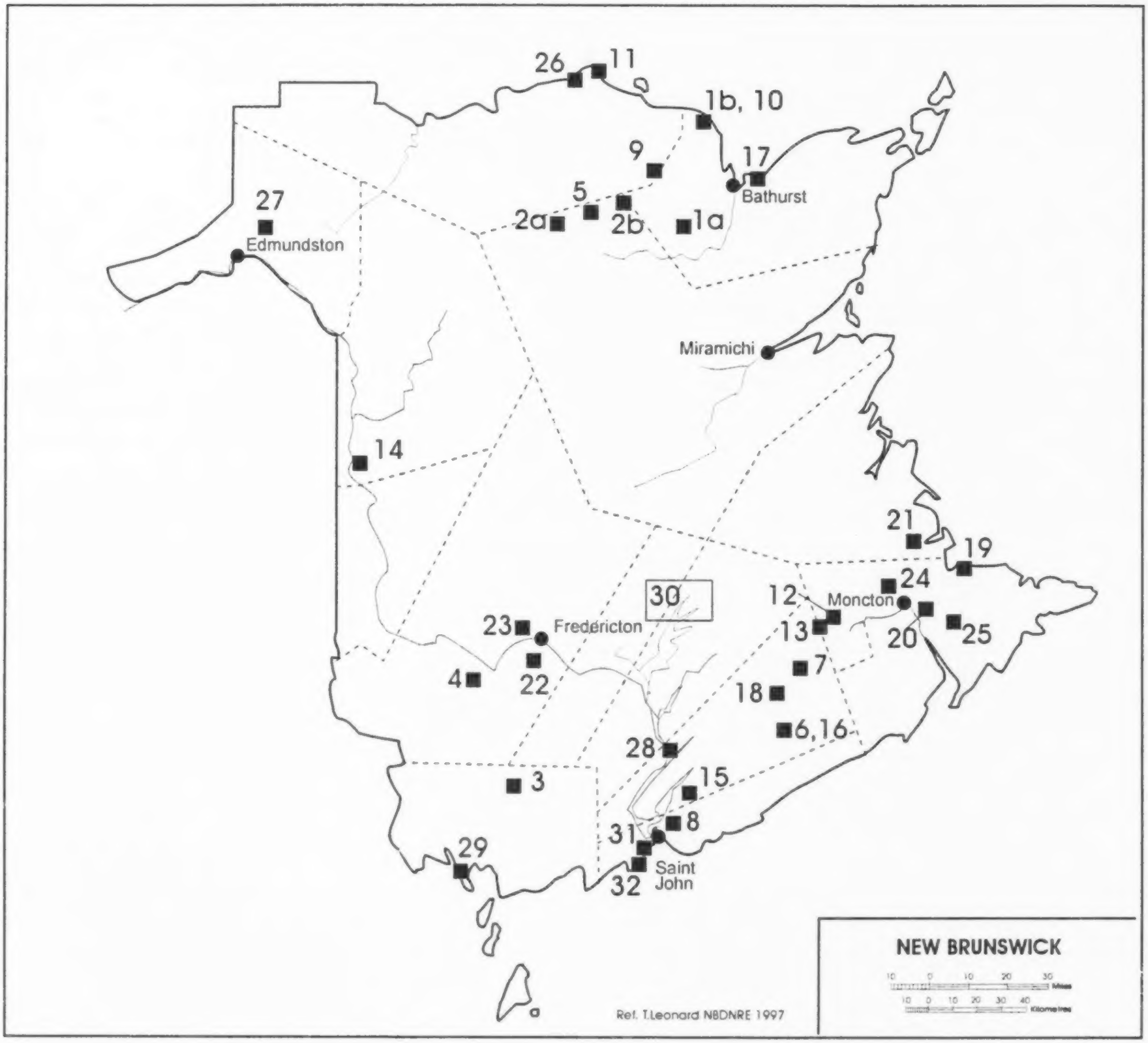
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Figure 9. Metallic mineral, industrial mineral (excluding peat), and energy producers in New Brunswick in 2001.

1. Noranda Inc.: (a) Brunswick mine (Pb,Zn); (b) Belledune lead smelter (Cu,Pb,Zn,Ag)
2. CanZinco Ltd.–Caribou Mine Division: (a) Restigouche mine (Zn,Pb,Ag,Cu); (b) Caribou mine (Zn,Pb,Cu,Ag,Au)
3. ADEX Mining Inc.,Mount Pleasant mine (Sn, In, W, Mo, Zn,Cu, Bi)
4. APOCAN Inc., Lake George mine (Sb)
5. Murray Brook Resources Inc. (a wholly owned subsidiary of NovaGold Resources Inc.), Murray Brook mine (Au, Cu, Pb, Zn)
6. Potash Corporation of Saskatchewan Inc.(Cassidy Lake Division) processing facility
7. Potash Corporation of Saskatchewan Inc.(New Brunswick Division) (potash, salt)
8. Brookville Manufacturing Company (limestone, dolomite)
9. Elmtree Resources Ltd. (limestone)
10. Belledune thermal generating station; Port of Belledune
11. Dalhousie thermal generating station
12. Graymont (NB) Inc. (limestone)
13. Lafarge Canada Inc. (limestone)
14. Upper Kent Lime Works Ltd. (marl)

RIGHTS In 2001, CanZinco Ltd., a wholly owned subsidiary of Breakwater Resources Ltd. held 189 claims (*Mining Act*, Chapter M14.1, S.N.B. 1985) and Mining Leases 255 (Restigouche) and 246 (Caribou).

LOCATION The Restigouche Zn, Pb, Ag, Cu deposit (Figure 9: 2a) is on the Road to Resources (Highway 180), about 80 km west of Bathurst in Restigouche County. (Lat. 47° 30.2' N; Long. 66° 33.5' W; NTS 21 O/7, 10). The Caribou mine (Figure 9: 2b) is also on the Road to Resources, about 50 km from Bathurst (Lat. 47° 33' N; Long. 66° 17.6' W; NTS 21 O/9).

HISTORY Restigouche (Early history is described in Miscellaneous Report 13, "New Brunswick's Mineral Industry, 1993.")

Marshall Minerals Corp. acquired the property rights from Placer Dome Inc. in March 1988. Results of an extensive drilling program to further define reserves and processability of the ore proved favourable and, in February 1989, Marshall registered under the Province's Environmental Impact Assessment (EIA) Regulation. The project was subsequently screened in because the deposit is situated on Charlotte Brook, which flows into Upsalquitch Lake, a well-known sport fishing area in a relatively undisturbed part of the province. The company completed its EIA report and in August 1990 received a positive response from the Lieutenant-Governor-in-Council to its proposal to proceed with project development. A security of $1 600 000 was required to ensure the environmental integrity of the operation.

Marshall proceeded no further than the EIA approval in its acquisition of required government approvals. Although delays associated with the EIA process, the sharp downturn in zinc prices, and the closure of the Caribou operation led the company to put the deposit up for sale, the company later renewed its interest in the deposit. In 1993 with federal/provincial funding, Marshall continued metallurgical studies on the ore and initiated environmental and pit design studies.

Figure 9 concluded

15. Kingsway Materials Ltd. (crushed stone)
16. Atlantic Silica Inc. (silica)
17. Chaleur Silica (a Division of The Shaw Group) (silica)
18. Nelson Monuments Ltd. (dimension stone)
19. Smith Cut Stone and Quarries Limited (dimension stone)
20. Maritime Stone Works Inc. (dimension stone)
21. Bastarache Stone Quarrie (dimension stone)
22. Diamond Construction Limited (crushed stone)
23. Gray Stone Quarries, a division of Tri Gil Paving and Construction Ltd.; Warren Maritimes Ltd. (crushed stone)
24. Moncton Crushed Stone, a Division of Modern Construction Ltd.; H.E. Carson Limited (crushed stone)
25. Acadia Crushed Stone Division of Modern Construction Ltd.; MacDonald Paving and Construction Limited (crushed stone)
26. C.M. Stewart Company Limited (crushed stone)
27. Clarence Daigle et Fils Ltée (crushed stone)
28. Lafarge Construction Materials (sand and gravel)
29. Port of Bayside
30. N.B. Coal Limited (coal)
31. Coleson Cove thermal generating station
32. Lorneville pipeline

In 1995, Breakwater Resources Ltd., owner of the nearby Caribou mine, announced a metallurgical breakthrough that would enable the company to consider reopening the Caribou mine. Following a positive feasibility study and testing of Restigouche ore, Breakwater reached an agreement to purchase the Restigouche deposit from Marshall, with the intention of shipping Restigouche ore to the Caribou mill for processing. In 1996, Breakwater Resources, through its subsidiary East West Caribou Mining Ltd., received regulatory approval to mine the Restigouche deposit. Mining of the deposit began in the spring of 1997.

Caribou (Early history is described in Miscellaneous Report 13, "New Brunswick's Mineral Industry, 1993.")

In October 1990, East West Caribou Mining Ltd. announced the shutdown of the mine because of a significant decrease in the price of zinc, the economic recession and the Persian Gulf crisis. At the time of closure the operation had exceeded planned daily production and was running at 2800 t/d. Early in 1992, East West Caribou's parent company, Breakwater Resources Ltd., entered into an agreement with the Roy Shipes Group of Tucson, Arizona, who would invest $5 000 000 in the company. Under the agreement, Arimetco International Inc. (President: Roy Shipes) assumed management of Breakwater. The debt held by Breakwater was renegotiated to a more manageable size and efforts were begun to review alternate methods for extracting metals from the complex Caribou ore. At the same time Caribou raised its tailings dam, which had the beneficial effect of submerging previously exposed tailings, thus curtailing the generation of acid from the impoundment.

GEOLOGY The Restigouche deposit occurs within the Middle Ordovician Mount Brittain Formation at the contact between feldspar-crystal poor (footwall) and feldspar-crystal rich (hanging wall) felsic volcanic rocks. The orebody is elongate in form and plunges to the northwest at 15–20°, oblique to the northeast structural trend. It is 490 m long and averages 90 m wide and 30 m thick. The deposit consists of two separate, stratabound, massive sulphide lenses that coalesce in the central part of the orebody. The sulphides comprise, in order of abundance, pyrite, sphalerite, galena, and chalcopyrite and have been traced to a vertical depth of 183 m to the north. Two northwest-trending diabase dykes transect the Restigouche deposit and are parallel to faults that exhibit minor offset.

EMPLOYEES Twelve people remain on site, two at Restigouche and the remainder at Caribou.

RESERVES Restigouche Marshall Minerals Corp. reported total reserves of 1 730 000 t grading 0.35% Cu, 5.36% Pb, 6.94% Zn, 112.1 g/t Ag, and 1.2 g/t Au. This includes 1 150 000 t of open pit reserves grading 0.38% Cu, 5.96% Pb, 7.71% Zn, 124.1 g/t Ag, and 1.37 g/t Au using a 6% combined lead–zinc cutoff.

Caribou Total reserves are 13 000 000 t grading 8.18% Zn, 3.52% Pb, 0.38% Cu, 102 g/t Ag and 1.4 g/t Au (*Northern Miner*, March 18, 1996).

PRODUCTION The two operations have a combined production target of 3000 t/d (1650 t/d for Caribou and 1350 t/d for Restigouche).

STATUS Operations remained suspended in 2001 pending improved metal prices, refurbishment of the concentrator and securing of financing.

DEVELOPMENTS As part of the 1997 operating plan, the Caribou concentrator was extensively modified and expanded. It was redesigned to produce separate zinc and lead concentrates, rather than a bulk concentrate as was the case when it last operated (in 1990). Surface preparation of the Restigouche open pit began in the fall of 1996. The first ore was produced in the spring of 1997. All ore from the Restigouche site was trucked to the Caribou mine site (Figure 9: 2b) for processing.

Falling metal prices and metallurgical difficulties encountered in processing the combined Caribou and Restigouche mine ores caused a suspension of operations at both mines in August 1998.

In 2001, BioteQ Environmental Technologies Inc., a Vancouver-based company, demonstrated the successful pilot-scale treatment of mine effluent at the Caribou site using its proprietary Biosulphide Process. This technology has the potential to remove metals profitably from slurried tailings as well as mine water. Plans for the construction of Canada's first commercial plant (also at the Caribou mine site) were announced in June.

ADEX Mining Inc.
(Mount Pleasant Mine)

COMPANY ADEX Mining Inc. (formerly ADEX Mining Corporation) had its head office at 172 King St. E., Suite 810, P.O. Box 13, Toronto, Ontario M5A 1J3. Telephone: (416) 947-1179. Having been de-listed from the Toronto Stock Exchange, the company no longer maintains a head office. Local address: P.O. Box 150, St. George, New Brunswick E0G 2Y0. The company's senior representative is former CFO Errol Farr.

RIGHTS In 2001, ADEX Minerals Corp. held 102 claims (4 claims covering the mine area and 98 claims surrounding the mine area) under the *Mining Act*, Chapter M-14.1, S.N.B. 1985.

LOCATION The Mount Pleasant Sn, In, W, Mo, Zn, Cu, Bi property (Figure 9: 3) is about 50 km northeast of St. Stephen, Charlotte County, New Brunswick (NTS 21 G/7W).

HISTORY (Early history is described in Miscellaneous Report 13, "New Brunswick's Mineral Industry, 1993.")

In December 1993, Piskahegan Resources Limited purchased the Mount Pleasant mine property from LAC Minerals Ltd. and Billiton Metals Canada Ltd. In 1994, ADEX Mining Corporation agreed to fund exploration and metallurgical work in the amount of $525 000, with the aim of earning the right to acquire a 50.1% interest in Piskahegan Resources Limited. On May 1, 1995, ADEX Mining Corporation acquired 100% of Piskahegan Resources Limited for $9 300 000 in cash and shares. Meanwhile, exploration and metallurgical testing continued while the company attempted to secure financing commitments. In November 1995, the name of the company was changed to ADEX Mining Inc.

In April 1996, ADEX Mining Inc. announced it had secured a financing commitment from the Malaysian Smelting Corp. (MSC), under which MSC would have the right to acquire up to 51% of ADEX for $28 000 000. The bulk of the investment was conditional on the delivery of a positive feasibility study for the development of the Mount Pleasant mine. Of the total investment, $2 000 000 was earmarked for the preparation of the study. In 1997 ADEX received a consultant's feasibility study. The conclusions were disappointing, as the estimated capital costs were too high to justify a production decision at that time.

Reserves (Source: ADEX Mining Corporation, Summary Prefeasibility Report, Oct. 1995)

Zone	Description	Category	Tonnage (t)	Grade						
				Sn (%)	Zn (%)	Bi (%)	In (g/t)	Cu (%)	MoS_2 (%)	WO_3 (%)
North	Endo & Contact Zones (u/g)	Proven	2 774 000	0.9	0.34	0.08	46.88	0.14	0.06	0.13
		Probable	60 000	0.92	0.34	0.08	46.88	0.14	0.06	0.13
		Possible	200 000	1.15	0.34	0.08	46.88	0.14	0.06	0.13
North	Deep tin (u/g)	Probable	2 140 000	0.6	0.8	0.06	121.19	0.12	0.05	0.08
North	Tin lodes (o/p)	Probable	2 000 000	0.2	0.96	—	125	0.1	—	—
North	W–Mo–Bi (u/g)	Possible	11 500 000	0.11	0.33	0.08	31.25	0.05	0.09	0.24
Saddle	Tin deposit (u/g)	Possible	2 000 000	0.92	0.34	0.08	46.88	0.14	0.06	0.13
Fire Tower	W–Mo–Bi (u/g)	Proven	9 000 000	0	0.08	0.1	31.25	0.05	0.2	0.4
Fire Tower N	Tin deposit (u/g)	Possible	250 000	0.19	2.24	0.13	206.25	0.14	0.2	0.28
Halo	(u/g and o/p)	Possible	15 000 000	—	1.5	—	109.38	—	—	—

Notes: 1 oz./ton equals 31.0025 g/t; u/g (underground); o/p (open pit)

The company's positive prefeasibility study was based on proven and probable reserves of 5 100 000 t grading 0.77% tin, 2.3 oz./ton indium, 0.5% zinc and 0.12% copper.

Production None since 1985.

Status The operation continues to be suspended. At year's end (2001), the property remained under care and maintenance.

Employees During 2001, one company officer was on site.

Developments The company continues to review its options with regards to the disposal of the property.

APOCAN Inc.
(Lake George Mine)

Company APOCAN Inc. The mine address is R.R. 1, Prince William, New Brunswick E0H 1S0. Telephone is (506) 366-2885. The Mine Manager is Wayne Marshall.

Rights In 2001, APOCAN Inc. held Mining Lease 250 under the *Mining Act*, Chapter M-14.1, S.N.B. 1985.

Location The Lake George antimony mine (Figure 9: 4) is approximately 15 km north of Harvey Station and 40 km west-southwest of Fredericton, York County (NTS 21 G/14E).

History (Early history is described in Miscellaneous Report 19, "New Brunswick's Mineral Industry, 1994.")

In 1987, Landmark Corporation (formerly Durham Resources Inc.) sold the property to Dominion Explorers Inc., one of its subsidiary companies. The low price of antimony concentrate, the unfavourable exchange rate for the Canadian dollar, and low ore reserves forced Dominion Explorers Inc. to reduce annual operating costs as much as 12% in an attempt to remain viable. A work-sharing program was negotiated with the Federal government but was not fully implemented. The operation continued through 1989 but was shut down permanently on January 19, 1990.

Following the closure of the mine, the property was purchased by APOCAN Inc.; Mining Lease 250 was transferred to the company in February, 1990. As a result of sharply higher antimony prices in the second half of 1994, APOCAN decided to resume operations at the Lake George mine. A Certificate of Approval to dewater the underground workings was issued in October, 1994 and in December work began on the installation of a new hoist.

Mine production officially resumed in July 1996. Production targets were reached or exceeded, but problems with the hoist caused a shutdown in December of the same year. The shutdown was prolonged by a sharp drop in the antimony price. Despite hopes that the price would recover sufficiently to allow a resumption of operations, high metal inventories in global markets continue to depress the price.

RESERVES Proven, probable and possible ore reserves: 262 000 t of ore grading 3.45% Sb.

STATUS The operation remains suspended.

DEVELOPMENTS At year's end, the mine continued to be under care and maintenance.

Murray Brook Resources Incorporated
(a wholly owned subsidiary of NovaGold Resources Inc.)
(Murray Brook Mine)

COMPANY The Murray Brook gold, copper, zinc, lead deposit is owned and was operated by Murray Brook Resources Incorporated, whose parent company is NovaGold Resources Inc. The head office for NovaGold Resources Inc. is: 3 Spectacle Lake Drive, Suite 300, Dartmouth, Nova Scotia, B3B 1W8. Telephone: (902) 468-9270. The Chairman and Chief Executive Officer is Gerald J. McConnell; the President and Chief Operating Officer is Rick van Nieuwenhuyse; the Vice-President of Canadian Operations is William L. Young.

RIGHTS In 2001, Murray Brook Resources Incorporated held Mining Lease 252 under the *Mining Act*, Chapter M14.1, S.N.B. 1985.

LOCATION The Murray Brook deposit (Figure 9: 5) is approximately 80 km west-southwest of Bathurst in Restigouche County (Lat. 47° 31.5' ; Long. 66° 25.8' ; NTS 21 O/9W). It is accessible via Highway 180 and a newly built access road.

HISTORY (Early history is described in Miscellaneous Report 13, "New Brunswick's Mineral Industry, 1993.")

Murray Brook Resources Inc. successfully completed the mining and vat-leach (indoor) processing of the gold-bearing gossan in early 1992. Known for its innovative extraction methods, the company began mining the underlying copper zone in late 1992, with the intention of extracting the metal using a bio-assisted, sulphuric acid, heap-leach (outdoor) method. Unforeseen delays caused the project to miss the seasonal window for this process and startup was delayed. The agreement that NovaGold Resources signed with Arimetco International Inc. and Breakwater Resources Ltd. to develop further the copper zone of the Murray Brook mine expired with neither company exercising its option.

GEOLOGY The Murray Brook deposit occurs within fine-grained sedimentary rocks that conformably underlie feldspar-phyric tuff of the Middle Ordovician Mount Brittain Formation and gradationally overlie quartz wacke and slate of the Miramichi Group. Previously, these sedimentary rocks were assigned to the Patrick Brook Formation, part of the Miramichi Group, but since the discovery of thin interbedded tuff layers, they are now included in the Mount Brittain Formation. The latter is structurally overlain by mafic volcanic rocks of the Boucher Brook Formation.

The deposit, which prior to mining was capped by a thick gossan, dips moderately to the northwest, plunges gently to the northeast, and appears to pinch out in that direction. It is surrounded by a 1–3 m wide halo of chloritized sedimentary rocks containing disseminated pyrite. The massive sulphides comprise pyrite, sphalerite, chalcopyrite, galena, and arsenopyrite, in decreasing order of abundance and are divisible into copper, pyrite and lead–zinc zones. The copper zone occurs along the footwall and hanging-wall contacts and is generally separated from the lead–zinc zone by a zone of massive pyrite containing minor amounts of the other sulphides.

EMPLOYEES There were no employees at the mine site in 2001.

RESERVES Geological resources of the copper zone are 596 000 t grading 2.81% Cu.

PRODUCTION During the three years the mine operated (1989–1992), 1 413 155 g (45,434 oz.) of gold and 10 776 kg (346,457 oz.) of silver were produced.

STATUS The operation is now closed.

DEVELOPMENTS Under the impact of a substantially lower copper price, the company decided in 1998 not to proceed with further mining at Murray Brook, despite some initially encouraging results from exploration drilling at the site. During the year, the company completed a UTEM survey and drilled 14 holes on its Murray Brook deposit. The object of the drilling was to test the down-plunge extent of the known Cu zone and to determine if the deposit has a significant Pb–Zn zone prior to reclaiming the open pit. Modelling of the data from previously drilled vertical holes, using a commercially available 3-D software package, showed that the deposit was virtually untested toward the northwest, in the F_2 down-plunge direction. The drilling confirmed that the deposit does continue to the northwest. The best reported Cu intersection was in hole MB-98-3, which contained 13.6 m grading 4.35% Cu, including 7.0 m grading 7.29% Cu. The best reported lead–zinc intersection was in hole MB-98-5A, which contained 20.2 m grading 2.08% Pb, 6.07% Zn and 73.66 g/t Ag. Some reclamation work was done during the year, including the placement of the remaining stockpiled copper ore in the pit.

In 1999, the company received regulatory approval for its updated reclamation plan. Final reclamation began in the spring of 2000 and was completed in September. A program of environmental monitoring continues.

INDUSTRIAL MINERALS

The extraction and processing of industrial minerals resources in New Brunswick is, for the most part, directed to the following ten commodities: peat, potash, salt, limestone, dolomite, marl, silica, dimension stone, crushed stone, and sand and gravel. Several of these are exported to markets throughout the world.

Peat

Nineteen peat companies were active in the Province in 2001. Most of the development is concentrated in northeastern New Brunswick, mainly in the Acadian Peninsula of Gloucester County east of Bathurst, and in the

Baie-Ste-Anne region of Northumberland and Kent counties to the east and southeast of Miramichi (Figure 10). About 85% of the 4 300 ha currently opened for production are located on Crown lands.

Peat production in 2001 totaled 13 200 000 bales, a decrease of 3% compared to the preceding year. Shipments reached 12 500 000 bales, a decrease of 5% with respect to 2000. In June 2001, inventories stood at 3 100 000 bales; in December that number was 6 100 000 bales. The trend toward using large packaging sizes continued with 60% of the peat moss shipped in sizes larger than the traditional 170 dm^3 bag.

The United States continues to be the principal export market for New Brunswick peat producers. In 2001, about 6 800 000 bales were shipped to the USA and 3 500 000 bales were distributed in Canada. The Japanese market continued to favor peat of Canadian origin and accounted for 14% of New Brunswick's exports.

There are 35 Crown peat leases covering 37 peatlands; 30 peat leases were in production. Five additional operations are located entirely on private land.

ASB Greenworld Ltd.

COMPANY ASB Greenworld Ltd., 200, chemin Daigle, Pointe-Sapin (Nouveau-Brunswick) E9A 1T6. Telephone: (506) 876-3937. The Manager is Camille-Ernest Daigle.

RIGHTS ASB Greenworld Ltd. holds Peat Lease No. 19 (826 ha – Peatland 324E) under the *Quarriable Substances Act*, Chapter Q-1.1, S.N.B. 1991.

LOCATION Peatland 324E is in Pointe-Sapin, Kent County (Figure 10: 1).

HISTORY The company began site preparation in 1978. A peat lease was issued in 1982. In 1997, a plastic bag extruding and printing facility was added to the processing plant. A 200 ha extension was added to the company's existing lease in 2001.

PRODUCTION The company produces milled peat (vacuum and Haku methods) and peat-based growing mixes.

DEVELOPMENT The company continued to work toward the development of new peat-based growing mixes.

EMPLOYEES In 2001, 15 to 55 persons.

Beausejour Peat Moss Inc.

COMPANY Beausejour Peat Moss Inc., C.P. 2006, Grand-Barachois (Nouveau-Brunswick) E4P 8V1. The President is Paul-Émile Leger. Telephone: (506) 532-1172.

RIGHTS The company holds Peat Lease No. 37 (167 ha – Peatland 76) under the *Quarriable Substances Act*, Chapter Q-1.1 S.N.B. 1991.

LOCATION This bog is approximately 5 km southeast of Shédiac, Westmorland County (Figure10: 2).

History In 1991, Beausejour Peat Moss Inc. applied for a Peat Exploration Licence for portions of Peatland 76 held by the Crown. During the same year, the company acquired freehold land in the northeastern sector of Peatland 76. In 1992, the licence application was dropped in favour of an Option. Peat extraction began on freehold land. In 1993, the company applied for and received a Peat Exploration Licence. A Peat Lease was issued for the Crown portion of the bog in 1994. In 2000, a new processing plant was constructed.

Production The company produces milled peat and peat-based compost products.

Development Development of the production area continued. A hydrogeological study of the peatland was carried out by Cynthia Carrier under the Maritime Groundwater Initiative and the supervision of Yves Michaud, Geological Survey of Canada.

Employees In 2001, 3 to 23 persons.

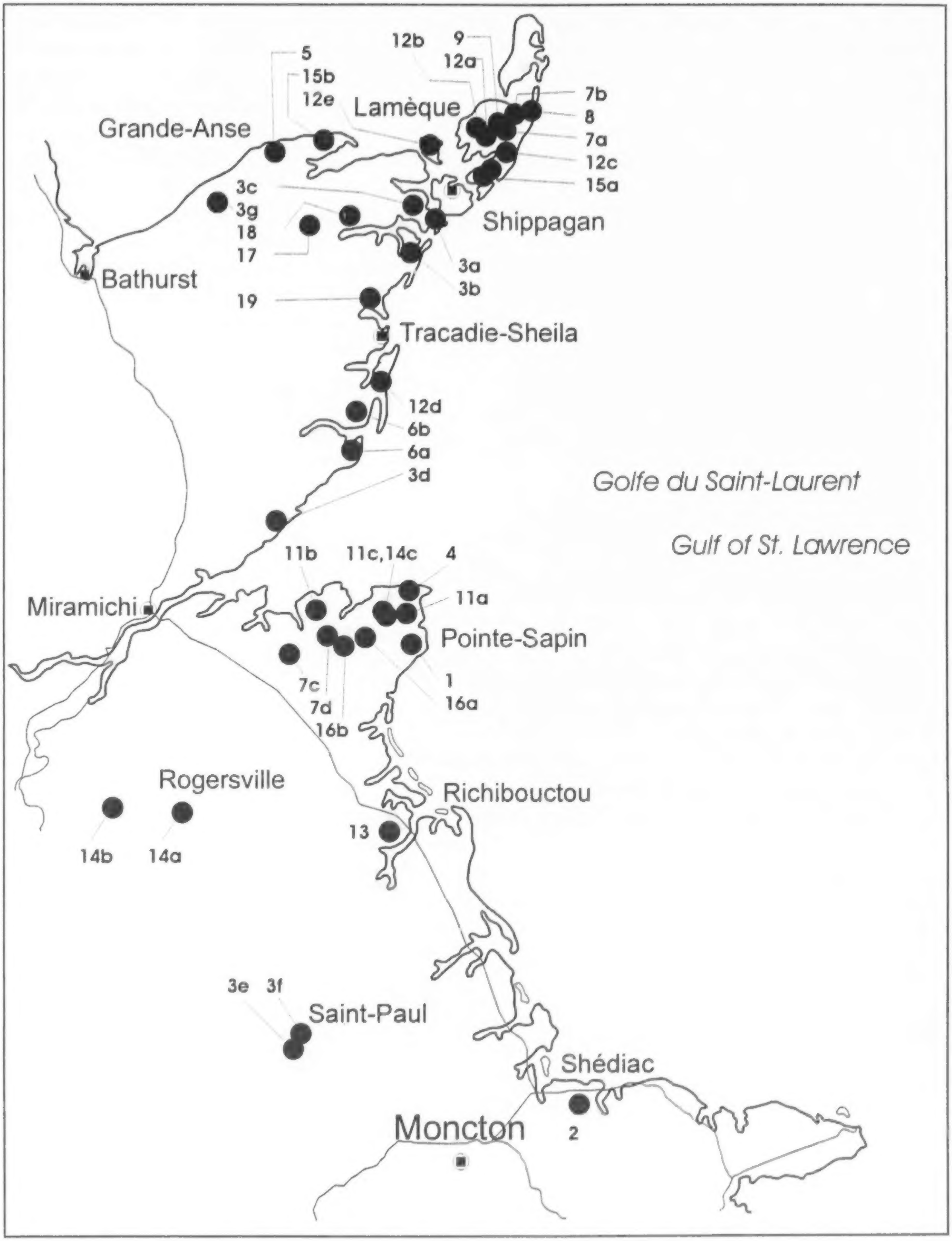
Compagnie de Tourbe Fafard ltée

Company Compagnie de Tourbe Fafard ltée / Fafard Peat Moss Co. Ltd., 422, chemin Pallot, Inkerman (Nouveau-Brunswick) E8P 1B5. Telephone: (506) 336-9715. The Manager is Denis Mallet.

Rights Compagnie de Tourbe Fafard ltée holds Peat Lease Nos. 4 (218 ha – Peatland 530), 5 (505 ha – Peatland 532), 6 (607 ha – Peatland 529), 22 (206 ha – Peatland 353), 25 (393 ha – Peatland 41), 34 (398 ha – Peatland 40) and 41 (684 ha – Peatland 552) under the *Quarriable Substances Act*, Chapter Q-1.1, S.N.B. 1991.

Legend (Figure 10)

1. ASB Greenworld Ltd. (peat)
2. Beausejour Peat Moss Inc. (peat)
3. Compagnie de Tourbe Fafard ltée (peat): (a) Inkerman; (b) and (c) Shippagan; (d) Burnt Church; (e) Birch Ridge; (f) Stonehaven
4. Good Earth Canada Ltd. (peat)
5. Grande Anse Peat Moss Co. Ltd. (peat)
6. Heveco Ltd. (peat): (a) Tabusintac; (b) Brantville
7. La Mousse Acadienne (1979) ltée (peat): (a) Coteau Road (b) Petit-Shippagan; (c) St. Margarets; (d) Eel River
8. La Tourbe de Pigeon Hill ltée (peat)
9. La Tourbière de Petit-Shippagan (peat)
10. La Tourbière du Centre de l'Île ltée (peat)
11. Le Groupe Berger ltée (peat): (a) St-Camille; (b) Bay du Vin; (c) St-Camille
12. Le Groupe Qualité Lamèque ltée (peat): (a) and (b) Lamèque; (c) Haut-Lamèque; (d) Rivière-du-Portage; (e) Pokesudie Island
13. Malpec Peat Moss Ltd. (peat)
14. Premier Horticulture (Premier Tech ltée) (peat): (a) south and (b) west of Rogersville; (c) Escuminac
15. Sun Gro Horticulture Canada Ltd. (peat): (a) Lamèque; (b) Maisonnette
16. Theriault & Hachey Peat Moss Ltd. (peat): (a) and (b) Eel River Bridge
17. Tourbière 2000 inc. (peat)
18. Tourbière L.M. ltée (peat)
19. Tourbière Tracadie ltée (peat)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12e
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Lamèque
Grande-Anse
7b
8
7a
12c
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3g
18
17
Shippagan
3a
3b
Bathurst
19
Tracadie-Sheila
12d
6b
6a
3d
Golfe du Saint-Laurent
Gulf of St. Lawrence
11b
11c,14c
4
11a
Miramichi
Pointe-Sapin
7c
7d
16b
1
16a
Rogersville
Richibouctou
13
14b
14a
3e
3f
Saint-Paul
Shédiac
Moncton
2

Figure 10. Peat extraction sites in New Brunswick, 2001

Location Peatland 530 is off Route 113 at Inkerman (Figure 10: 3a), Peatland 532 is 15 km south of Shippagan (Figure 10: 3b) and Peatland 529 is 8 km southwest of Shippagan (Figure 10: 3c), all in Gloucester County; Peatland 353 is located 3 km southwest of Burnt Church, Northumberland County (Figure 10: 3b); Peatlands 40 and 41 are located near Birch Ridge, Kent County (Figure 10: 3c); Peatland 552 is located near Stonehaven, Gloucester County (Figure 10: 3d).

History Compagnie de Tourbe Fafard ltée began operations in New Brunswick in 1942 by opening a bog near Shippagan (Peatland 530). New plants were opened in 1955 at Inkerman (Peatland 532) and in 1960 at Évangéline (Peatland 529). Initial production was block-cut peat but by 1973 the entire operation had changed to the production of milled peat. Since 1985, the production of peat mixes has become an important aspect of the New Brunswick operation. A perlite–vermiculite processing plant and a new peat-based growing mix plant were built at Peatland 532 in 1989. In 1998, the company completed a major corporate restructuring plan. Conrad Fafard, Inc. became a major shareholder of Québec-based Les Produits Horticoles Fafard ltée, which previously had controlling interest in la Compagnie de Tourbe Fafard ltée. A new company and wholly owned subsidiary of Conrad Fafard, Inc. named Fafard Products, Inc. was created, with head office in Inkerman, New Brunswick. That holding company is also majority shareholder of Compagnie de Tourbe Fafard ltée.

In 1987, Compagnie de Tourbe Fafard ltée acquired the operation of Les Équipements Tardif Inc. on Peatland 41 (Division Kent). Production from Peatland 41 had begun in 1984. In 1991, a peat lease was issued for adjacent Peatland 40. Production from that site began in 1999.

In 1988, Compagnie de Tourbe Fafard ltée acquired the assets of Burnt Church Peat Moss Co. Ltd. (Peatland 353 - Division Burnt Church). Production from the site began in 1991. A bagging plant was constructed in 1995.

In 2001, a peat lease was issued for Peatland 552.

Production The company produces milled peat. Peat-based growing mixes are manufactured at the Inkerman plant (Peatland 532).

Development No new development to report.

Employees In 2001, 22 to 182 for the combined operations.

Good Earth Canada Ltd.

Company Good Earth Canada Ltd., 5960 Broadway, Lancaster, N.Y. 14086, United States of America. Telephone: (716) 684-8111. The President is Guenther Burkhardt.

Rights Good Earth Canada Ltd. holds Peat Lease No. 30 (734 ha – Peatland 338) under the *Quarriable Substances Act*, Chapter Q-1.1, S.N.B. 1991.

Location Peatland 338 is in Escuminac, 50 km east of Miramichi, Northumberland County (Figure 10: 4).

History The company was issued a peat lease in 1986 following the cancellation of Peat Lease No. 21 (Gulf Peat Co. Ltd.) in January 1986. Production began in 1987.

Production The company produces milled peat and peat-based growing mixes.

Development No new development to report.

Employees In 2001, 3 to 9 persons.

Grande Anse Peat Moss Co. Ltd.

Company Grande Anse Peat Moss Co. Ltd., C.P. 90, 70, avenue de la Tourbe, Grande-Anse (Nouveau-Brunswick) E8N 2T9. Telephone: (506) 732-2854. The Manager is Patricia Whelton.

Rights Grande Anse Peat Moss Co. Ltd. holds Peat Lease No. 8 (166 ha) on Peatland 561, under the *Quarriable Substances Act*, Chapter Q-1.1, S.N.B. 1991.

Location Peatland 561 is in the village of Grande-Anse, Gloucester County (Figure 10: 5).

History The company started a manual block-cut operation in 1961, which was mechanized in 1966. The conversion to a milled peat operation began in 1977. The plant was extensively modernized in 1991.

Production The company produces milled peat.

Development No new development to report.

Employees In 2001, 7 to 62 persons.

Heveco Ltd.

Company Heveco Ltd., 4534, Route 11, Tabusintac, (Nouveau-Brunswick) E9H 1J4. Telephone: (506) 779-9277. The Manager is Rolf Mecking.

Rights Heveco Ltd. holds Peat Lease Nos. 9 (1080 ha – Peatland 524) and 24 (174 ha – Peatland 522) under the *Quarriable Substances Act*, Chapter Q-1.1, S.N.B. 1991.

Location Peatland 524 is 2 km southeast of Tabusintac (Figure 10: 6a) and Peatland 522 is located 2 km east of Brantville (Figure 10: 6b), Northumberland County.

History Incorporated in 1962, the company is the only major Canadian producer of block-cut peat. Since 1981, it also has produced milled peat. Production on Peatland 522 began in 1989. The plant was extensively modernized in 1995.

Production The company produces block-cut peat, milled peat, and peat-based growing mixes.

Development In March 2001, the company's processing plant was destroyed by fire. The company is rebuilding the plant and intends to be fully operational in 2002.

Employees In 2001, 8 to 25 persons.

La Mousse Acadienne (1979) ltée

Company La Mousse Acadienne (1979) ltée / Acadian Peat Moss (1979) Ltd., C.P. 2002, Lamèque (Nouveau-Brunswick) E8T 3N3. Telephone: (506) 344-2225. The President is Gilles Haché.

Rights La Mousse Acadienne (1979) ltée holds Peat Lease No. 13 (232 ha – Peatland 568) under the *Quarriable Substances Act*, Chapter Q-1.1, S.N.B. 1991. Three affiliated companies also hold peat leases: La Tourbe Chiasson ltée / Chiasson Peat Moss Ltd. (Peat Lease No. 23, 76 ha – Peatland 567); Tourbière Miramichi ltée / Miramichi Peat Ltd. (Peat Lease No. 31, 770 ha – Peatland 3; Peat Lease No. 36, 580 ha – Peatland 301).

Location Peatland 568 is adjacent to the Coteau Road on Lamèque Island, Gloucester County (Figure 10: 7a); Peatland 567 is 3 km southeast of Petit-Shippagan, Gloucester County (Figure 10: 7b); Peatland 3 is 6 km northeast of St. Margarets, Northumberland County (Figure 10: 7c), and Peatland 301 is 8 km southwest of Eel River Bridge, Northumberland County (Figure 10: 7d).

History Established in 1965, the company began production on Peatland 568 in 1966. Peat Lease No. 23 was obtained in 1982. Before 1987, all the production from Peatland 567 was processed at the facilities of La Mousse Acadienne (1979) ltée. A bagging plant was installed on Peatland 567 in 1987. Peat Lease No. 31 was obtained in 1988 and production from Peatland 3 began in 1989. Peat Lease No. 36, obtained in 1994, started to produce loose peat in 1999.

Production The company and its affiliates produce milled peat.

Development Continued field preparation on Lease 36. La Tourbière Rivière-à-l'Anguille ltée / Eel River Peat Moss Ltd. (Peat Lease No. 36) was amalgamated with Tourbière Miramichi ltée / Miramichi Peat Ltd. In March 2001, La Mousse Acadienne (1979) received a prestigious award, the *Laurier de la PME*, from the Comité national de développement des ressources humaines de la francophonie canadienne. The award recognizes the company's contribution in diversifying the economy of a rural community.

Employees In 2001, 21 to 116 persons for the four combined operations.

La Tourbe de Pigeon Hill ltée

Company La Tourbe de Pigeon Hill ltée, C.P. 2067, 76 rue du Pêcheur, Lamèque (Nouveau-Brunswick) E8T 3N5. Telephone: (506) 344-5653. The President is Edmond Chiasson.

Rights La Tourbe de Pigeon Hill ltée holds Peat Lease No. 18 (234 ha – Peatland 569) under the *Quarriable Substances Act*, Chapter Q-1.1, S.N.B. 1991.

Location Peatland 569 is in Pigeon Hill on Lamèque Island, Gloucester County (Figure 10: 8).

History A peat lease was issued in 1979. In 2000, the processing plant was reconstructed and modernized.

Production The company produces milled peat.

Development Continued expansion of production fields.

Employees In 2001, 1 to 20 persons.

La Tourbière de Petit-Shippagan

Company La Tourbière de Petit-Shippagan, C.P. 2130, Lamèque (Nouveau-Brunswick) E8T 3N7. The contact person is François-Robert David, Director of Operations. Telephone: (506) 344-8064.

Rights The company is operating on its own land.

Location Peatland 579 is 7 km northeast of Lamèque, on the road to the Miscou bridge, Gloucester County (Figure 10: 9).

History The project was registered with the Department of the Environment early in 1993 and received approval in July 1993. Production of peat began in 1994.

Production The company produces milled peat and sells it unprocessed, in bulk.

Development No new development.

Employees In 2001, 1 to 7 persons.

La Tourbière du Centre de l'Île ltée

Company La Tourbière du Centre de l'Île ltée, 264, rue du Pêcheur Nord, Lamèque (Nouveau-Brunswick) E8T 1K2. The contact person is Pierrette Savoie. Telephone: (506) 344-8236.

Rights The company is operating on its own land.

Location Peatland 580 is in the town of Lamèque, Gloucester County (Figure 10: 10).

History The project was registered with the Department of the Environment in 1994 and received approval in November 1995. Production of peat began in 1996.

Production The company produces milled peat and sells it unprocessed, in bulk.

Development No new development.

Employees In 2001, 0 to 3 persons.

Le Groupe Berger ltée

COMPANY Le Groupe Berger ltée, 121, R.R. #1, St-Modeste (Québec) G0L 3W0. The President is Claudin Berger. Telephone: (418) 862-4462. The contact person is Andreas Avenriep. Telephone : (506) 228-9801.

RIGHTS Le Groupe Berger ltée holds Peat Lease Nos. 29 (603 ha – Peatland 337), 33 (159 ha – Peatland 354) and 39 (261 ha Peatland – 324N) under the *Quarriable Substances Act*, Chapter Q1.1, S.N.B. 1991.

LOCATION Peatland 337 is 2 km north of St-Camille (Figure 10: 11a), Peatland 354 is 35 km southwest of Bay du Vin (Figure 10: 11b), and Peatland 324N is immediately west of Peatland 337, across Highway 117 (Figure 10: 11c); all are in Northumberland County.

HISTORY In 1985, Le Groupe Berger ltée acquired a Peat Exploration Licence that was converted to Peat Lease No. 29 in 1986. Production on Peatland 337 began in 1987. In 1988, Le Groupe Berger ltée applied for and received a Peat Exploration Licence for Peatland 354. Peat Lease No. 33 was issued in 1991. Production from Peatland 354 began in 1992. On December 31, 1996, Berger Inc. transferred all of its assets to Le Groupe Berger ltée, a federally chartered company. In 1999, a perlite-expanding facility was constructed at the St-Camille site to supply the new peat mix plant, which became operational at the end of the same year.

PRODUCTION The company produces milled peat and peat mixes.

DEVELOPMENT The company continued to expand its production fields on Peatland 337 and began field preparation on Peatland 324N.

EMPLOYEES In 2001, 65 to 162 persons.

Le Groupe Qualité Lamèque ltée

COMPANY Le Groupe Qualité Lamèque ltée / Lameque Quality Group Ltd., 36, rue de la Tourbe, Lamèque (Nouveau-Brunswick) E8T 1A3. Telephone: (506) 344-2293. The President is Florent Chiasson.

RIGHTS Le Groupe Qualité Lamèque ltée holds Peat Lease Nos. 7 (202 ha – Peatland 600), 14 (142 ha – Peatland 580), 16 (413 ha – Peatlands 516 and 517), 17 (115 ha – Peatland 576) and 28 (104 ha – Peatland 578) under the *Quarriable Substances Act*, Chapter Q-1.1, S.N.B. 1991.

LOCATION Peatlands 580 and 578 are 4 km north of Lamèque (Figure 10: 12a and 12b) and Peatland 576 is 4 km east of Haut-Lamèque (Figure 10: 12c), Gloucester County; Peatlands 516 and 517 are 1.5 km east of Rivière-du-Portage, Northumberland County (Figure 10: 12d); and Peatland 600 is on Pokesudie Island, Gloucester County (Figure 10: 12e).

HISTORY Established in 1971, La Tourbière de Lamèque ltée became a division of Le Groupe Qualité Lamèque ltée (La Tourbière de Lamèque / Lameque Peat Moss) in 1989. Production on Peatland 576 began in 1980. Production on Peatland 578 began in 1989. In 1993, a fire destroyed the main processing plant in Lamèque. The plant became operational again during the summer of 1994.

La Tourbière de St-Raphaël ltée became a division of Le Groupe Qualité Lamèque ltée (La Tourbière de St-Raphaël / St. Raphaël Peat Moss Ltd.) in 1989.

Portage Peat Moss Ltd. had started commercial production from Peatlands 516 and 517 in 1972. In 1985, Les Produits Canadien Suprême ltée, a former affiliated company of Le Groupe Qualité Lamèque ltée, acquired the operation. The operation is now a division of Le Groupe Qualité Lamèque ltée (Les Produits Canadien Suprême / Canadian Supreme Products Ltd.). In 1989, the company suspended operations. A resource evaluation survey was completed in 1990. In 1991, production resumed in selected areas; the peat is trucked to the Lamèque facility for blending and processing.

In 1960, a peat lease was granted to Bushland Products Limited and in 1967 was transferred to Atkins & Durbrow (N.B.) Ltd. Following a disastrous fire in 1978, the plant was rebuilt and production resumed in late 1980. La Tourbière de Pokesudie ltée / Pokesudie Peat Moss Ltd., a former subsidiary company of Le Groupe Qualité Lamèque ltée, acquired the property in 1988. The company became a division of Le Groupe Qualité Lamèque ltée (La Tourbière de Pokesudie / Pokesudie Peat Moss) in 1989. Part of the mine site is now abandoned and has been reclaimed for agriculture (cranberry fields and associated water reservoir).

PRODUCTION The company produces milled peat and growing mixes.

DEVELOPMENT Expansion of production area and increasing activity level at the Rivière-du-Portage site. In January 2000, exceptionally high tides brought salt water on production fields at the Pokesudie peatland resulting in significant loss of production potential at that site. The site was still not operational in 2001.

EMPLOYEES In 2001, 32 to 115 persons.

Malpec Peat Moss Ltd.

COMPANY Malpec Peat Moss Ltd., C.P. 118, Rexton (Nouveau-Brunswick) E0A 2L0. Telephone: (506) 523-9161. The Manager is Joe Curry.

RIGHTS Malpec Peat Moss Ltd. holds Peat Lease No. 20 (499 ha – Peatland 213) under the *Quarriable Substances Act*, Chapter Q-1.1, S.N.B. 1991.

LOCATION Peatland 213 is 3 km west of Rexton, Kent County (Figure 10: 13).

HISTORY The company is affiliated with Southern Importers, Inc., Greensboro, North Carolina, United States of America. It was issued a peat lease in 1982 and began production of milled peat in 1985. In 1995, the lease was expanded by about 250 ha. In the spring of 1997, a fire destroyed the bagging plant. The plant was rebuilt and full production resumed in 1998.

PRODUCTION The company produces milled peat.

DEVELOPMENT Field preparation in the northern part of the lease.

EMPLOYEES In 2001, 7 to 41 persons.

Premier Horticulture (Premier Tech ltée)

COMPANY A subsidiary of Entreprises Premier CDN ltée, 1, ave Premier, C.P. 2600, Rivière-du-Loup (Québec) G5R 4C9. The contact person is Michel Vachon, Director of Operations. Telephone: (418) 862-6356.

RIGHTS Peat Leases No. 35 (769 ha – Peatland 16), No. 38 (199 ha – Peatland 14) and No. 42 (251 ha – Peatland 324N) under the *Quarriable Substances Act*, Chapter Q1.1, S.N.B. 1991.

LOCATION Peatland 16 is on Highway 126, 3 km south of Rogersville in Kent County (Figure 10: 14a). Peatland 14 is located 30 km west of Rogersville in Northumberland County (Figure 10: 14b). Peatland 324N is located 3 km south of Escuminac in Northumberland County (Figure 10: 14c).

HISTORY Entreprises Premier CDN ltée applied for a Peat Exploration Licence for Peatland 16 in 1991 and a licence was issued in that same year. In 1992, a Peat Lease was issued to the newly formed subsidiary company, Les Tourbières Premier Atlantique ltée. Initial production of peat began in 1994 and a bagging plant was constructed in 1995. In 1999, Entreprises Premier CDN ltée changed its corporate designation to Premier Tech ltée with Premier Horticulture as one of its business divisions that includes the New Brunswick operations.

PRODUCTION The company produces milled peat.

DEVELOPMENT Development of production fields continued on peatlands 16 and 14. Production from Peatland 14 began in 2001 with the peat being transported in bulk to the processing plant located on Peat Lease No. 35.

EMPLOYEES In 2001, 1 to 26 persons.

Sun Gro Horticulture Canada Ltd.

COMPANY Sun Gro Horticulture Canada Ltd., 124, chemin de la Tourbe, Maisonnette (Nouveau-Brunswick) E8N 1P8. Telephone: (506) 727-3428. The Manager is Renald Boudreau.

RIGHTS Sun Gro Horticulture Canada Ltd. holds Peat Lease Nos. 10 (1390.6 ha – Peatlands 591 and 592) and 12 (396 ha – Peatland 562) under the *Quarriable Substances Act*, Chapter Q-1.1, S.N.B. 1991.

LOCATION Peatlands 591 and 592 are 3 km southeast of Lamèque (Figure 10: 15a) and Peatland 562 is 6 km west of Maisonnette (Figure 10: 15b), all in Gloucester County.

HISTORY In 1964, Western Peat Company Ltd., a Canadian company owned by Red Wing Peat Corporation (USA), established a base of operations at Maisonnette (Peatland 562). In 1970, Red Wing Peat Corporation purchased Atlantic Peat Moss Co. Ltd. at Shippagan (Peatlands 591, 592 and 527). Atlantic Peat Moss Co. Ltd. had produced from Peatland 527 (1953–1971) and from Peatland 591 since 1952.

In 1974, S.B. McLaughlin Associates Limited of Toronto, Ontario, purchased the holdings of the major shareholder, Red Wing Peat Corporation, and assumed control. This was followed by the combination of the business operations of Western Peat Company Ltd. and Atlantic Peat Moss Co. Ltd. into Western Peat Moss Limited.

In 1980, Fisons, a British company, acquired a 50% interest in Western Peat Moss Limited. The joint venture company was renamed Fisons Western Peat Moss Limited and then changed to Fisons Western Corporation in January 1982, when Fisons acquired the remaining McLaughlin interests. Production from Peatland 527 ceased in 1971 due to fire hazard to the town of Shippagan and the site was converted to Peat Lease No. 26 in 1984. The new plant on Lamèque Island (Peatland 591) opened in 1981. The company changed its corporate name to Fisons Horticulture Inc. in 1989.

In 1993, Fisons Horticulture Inc. was acquired by Sun Gro Horticulture Inc. The New Brunswick operation is managed by Sun Gro Horticulture Canada Ltd.

Former Peat Lease No. 26 was terminated in 1994 after appropriate restoration work had been completed.

PRODUCTION The company produces milled peat and peat-based growing mixes.

DEVELOPMENT Continued expansion of production fields on Peatland 591. Approximately 10 ha of abandoned production fields have undergone restoration work on Peatland 562 (Maisonnette). Experimental studies were conducted by McGill University on Peatland 591 to obtain information on the way in which drainage, peat mining and restoration changes carbon cycling in peatlands.

EMPLOYEES In 2001, 65 to 146 persons.

Theriault & Hachey Peat Moss Ltd.

COMPANY Theriault & Hachey Peat Moss Ltd., 201, chemin Theriault-Hachey, Baie-Sainte-Anne (Nouveau-Brunswick) E9A 1N7. Telephone: (506) 228-4530. Elphège Theriault is President. The Chief Executive Officer is Gary Williston.

RIGHTS Theriault & Hachey Peat Moss Ltd. holds Peat Lease No. 11 (482 ha – Peatland 324W) and Peat Lease No. 27 (125 ha – Peatland 302A) under the *Quarriable Substances Act*, Chapter Q-1.1, S.N.B. 1991.

LOCATION Peatlands 324W and 302A are 6 km south of Eel River Bridge, Northumberland County (Figure 10: 16).

HISTORY The company was formed in 1963 but block-cut peat had been produced from the site since 1961. In 1977, the block-cutting operation was converted to a milled peat operation. The company acquired a peat lease on Peatland 302A in 1985. Production on Peatland 302A began in 1990. A new processing plant was built in 1994.

PRODUCTION The company produces milled peat.

DEVELOPMENT New fields continue to be opened on Peatland 302A. Some block cut fields on Peatland 324W are being reconverted to vacuum milled peat production.

Employees In 2001, 8 to 79 persons.

Tourbière 2000 inc.

Company Tourbière 2000 inc., 2223 Route 350, Maltampec (Nouveau-Brunswick) E8P 1N4. Telephone: (506) 727-5251. The President is Adrien Landry.

Rights. The company is operating on its own land.

Location Peatland 950 is located 5 km east of Paquetville, north of highway 350, Gloucester County (Figure 10: 17).

History The project was registered with the Department of Environment and Local Government in September 1999 and received approval in February 2000. Production fields were opened in the fall of 2000. Peat extraction began in 2001.

Production The company produces milled peat and sells it unprocessed, in bulk.

Development No new development.

Employees In 2001, 1 to 3 persons.

Tourbière L.M. ltée

Company Tourbière L.M. ltée, 1081, Route 365, Gauvreau (Nouveau-Brunswick). Telephone: (506) 538-2632. The President is Laurie Chiasson.

Rights The company is operating on its own land.

Location Peatland 531A is located 3 km west of Haut-Pokemouche, Gloucester County (Figure 10: 18).

History The project was registered with the Department of the Environment in July 2000 and received approval in September of the same year. Field preparation followed with production beginning in 2001.

Production The company produces milled peat and sells it unprocessed, in bulk.

Development No new development.

Employees In 2001, 2 to 5 persons.

Tourbière Tracadie ltée

Company Tourbière Tracadie ltée (formerly known as *Les Entreprises Jean-Eudes Martin et Fils ltée*) 4092, boul. des Fondateurs, Saint-Isidore (Nouveau-Brunswick) E8M 1G3. The President is Sylvie Martin. Telephone: (506) 358-9800.

Rights The company operates on its own land.

Location Peatland 541 is located in Tracadie-Sheila, Gloucester County, along Highway 11 (Figure 10: 19).

History The project was registered with the Department of the Environment early in 1997 and received approval in June 1997. Production of peat began in 1997.

Production The company produces milled peat and sells it unprocessed, in bulk.

Development The company continued to develop its production area.

Employees In 2001, 1 to 5 persons.

Potash, Salt

Following its discovery in 1971, potash rapidly became a major contributor to the value of industrial mineral production in New Brunswick. In terms of its impact on the total value of minerals produced in the Province, potash remains second only to zinc. Until 1996, New Brunswick potash producers accounted for roughly 10% of Canada's productive capacity and between 10 and 15% of its annual production.

New Brunswick's world-class potash mining/milling and processing facilities (respectively, the Potash Corporation of Saskatchewan Inc. – New Brunswick and Cassidy Lake divisions) are situated in the southeastern part of the Province near the Town of Sussex.

Potash Corporation of Saskatchewan Inc. (Cassidy Lake Division)

Company Potash Corporation of Saskatchewan Inc. (Cassidy Lake Division) [PCS (Cassidy Lake)], Contact is Raoul Gauthier, General Manager, Potash Corporation of Saskatchewan Inc. (Cassidy Lake Division). Telephone: (506) 433-5445. Address is P.O. Box 5089, Sussex, New Brunswick E4E 5L2. Site Superintendent is Wally Farrah. Telephone: (506) 839-2146. Corporate office: Potash Corporation of Saskatchewan Inc., 122 – 1st Avenue S., Suite 500, Saskatoon, Saskatchewan S7K 7G3. Website: www. potashcorp. com.

Rights Potash Corporation of Saskatchewan Inc. (Cassidy Lake Division) holds a Potash Agreement (858.7 ha), under Section 25(2) of the *Mining Act*, Chapter M14.1, S.N.B. 1985.

Location The PCS(Cassidy Lake) processing operation (Figure 9: 6) is situated about 20 km southwest of Sussex, Kings County (NTS 21 H/12E).

History Potash and salt were discovered in the Salt Springs area by the New Brunswick Department of Natural Resources in 1973. Subsequent exploration and development rights to a 120 km^2 reservation area were granted to International Minerals and Chemical Corporation (IMC). Full-scale exploration (22 drill holes) began in 1975, and was successful in confirming a significant ore body. Despite extremely encouraging results from the drilling program, IMC sold the property to Denison Mines Limited of Toronto in the latter part of 1978. Construction of a 5-m-diameter exploration mine shaft was commenced in September, 1979, and reached a target depth of 835 m by 1982.

In December 1980, Denison Mines Limited assigned a 40% interest in the property to Potash Company of Canada Limited (Potacan). Potacan, owned jointly by Entreprise Minière et Chimique, and Kali und Salz AG, handled potash sales while Denison was the overall development manager.

A feasibility study completed in 1982 resulted in a production decision announcement on February 7, 1983. Work on the No. 2 shaft, the production shaft, commenced in 1983, along with continued underground development and the construction of the surface infrastructure related to the mill facility, tailings storage, and brine disposal. By July, 1985, all pre-production work was completed and the first shipment of potash was destined for Colombia on September 17, 1985.

Because of financial difficulties, Denison sold its interest in the property to its Potacan partners in 1991 and the name was subsequently changed to the Potacan Mining Company (PMC).

Throughout most of its 12 years of operation, Potacan generally maintained production levels greater than 75 % of its rated 1 300 000 product tonne capacity and had established itself as the Province's largest potash mining and milling facility. In the spring of 1997, water inflow occurred in the underground. Following unsuccessful attempts to reduce the flow to a manageable level, PMC's parent company, the Potash Company of Canada, announced the permanent suspension of operations at the Cassidy Lake mine about 6 months later. A plan was implemented to dispose of all surface tailings and carry out remedial site work. This closure reduced the Province's productive capacity by almost two thirds and resulted in the loss of hundreds of jobs.

Early in 1998, the former Potacan operation was purchased by the Potash Corporation of Saskatchewan Inc. The facility, now called *Potash Corporation of Saskatchewan Inc. (Cassidy Lake Division)* utilizes the existing processing facility and related infrastructure to upgrade standard-grade potash imported from company operations in western Canada. The result is a higher-value granular product supplied to markets in eastern Canada and the United States. The Cassidy Lake operation has an annual milling capacity of 1 300 000 t and a compaction capacity of 1 000 000 t of granular product. The operation is linked by rail to the port of Saint John, 60 km to the west, a critical marketing advantage in the efficient global distribution of this important commodity.

RESERVES AND GRADE Not available

PRODUCTION Production ceased in 1997. The Potash Corporation of Saskatchewan Inc. operates a custom processing facility on the property, which has an annual compaction capacity of 1 000 000 t of granular potash product. In 2000, the company's Cassidy Lake operation reported a 17% increase in its output of granular product over 1999, compacting 230 000 t of standard grade product from company operations in Rocanville, Saskatchewan (PotashCorp, 2000 Annual Report, p. 8). In 2001, PCS (Cassidy Division) compacted 234 000 t of Rocanville standard grade product. The market for most of this material is the eastern United States and Canada.

EMPLOYEES 28 persons in 2001

DEVELOPMENT In March 1998, the Potash Corporation of Saskatchewan Inc. purchased all outstanding shares from Potacan's holding company, the Potash Company of Canada Limited (an equal partnership between Kali und Salz of Germany and Entreprise Minière et Chemique of France). PCS is using the former Potacan mill to upgrade standard product from its Rocanville operation in western Canada into a higher-value granular product (annual granular capacity of 1 000 000 t). A new and efficient rail car unloading facility was subsequently installed to accommodate the efficient off-loading of standard grade product from Saskatchewan.

Potash Corporation of Saskatchewan Inc. (New Brunswick Division)

COMPANY Potash Corporation of Saskatchewan Inc. (New Brunswick Division) [PCS(NB)], P.O. Box 5039, Sussex, New Brunswick E4E 5L2. Telephone: (506) 433-5445. The General Manager is Raoul Gauthier. Corporate office: Potash Corporation of Saskatchewan Inc., 122 – 1st Avenue S., Suite 500, Saskatoon, Saskatchewan S7K 7G3. Website: www.potashcorp.com.

RIGHTS Potash Corporation of Saskatchewan Inc. (New Brunswick Division) holds a Potash Agreement (19 165.5 ha), under Section 25(2) of the *Mining Act*, Chapter M-14.1, S.N.B. 1985.

LOCATION The PCS(NB) mine/mill facility (Figure 9: 7) is on the north side of Highway 2, about 5 km east of Sussex, Kings County (NTS 21 H/11W, 21 H/14W).

HISTORY Following the discovery of potash in the Plumweseep–Penobsquis area by the New Brunswick Department of Natural Resources in 1971, exploration and development rights covering a 360 km^2 reservation area were granted to the Potash Company of America in 1973. After a comprehensive exploration program and feasibility study, the company proceeded with the construction of a 5-m-diameter exploratory mine shaft in the spring of 1978. The exploration shaft was completed in April and underground exploration was completed in October of 1980. On October 27, 1980, the Potash Company of America announced that it was proceeding to production with a mine capacity of 900 000 t/a although initial capacity would be 630 000 t/a.

Mine development, mill construction, and the Courtenay Bay potash shipping terminal in Saint John were completed in 1983. The first potash was produced from the mill on July 17, 1983. The first shipment of potash through the port facility in Saint John took place early in 1984.

After purchasing PCA early in 1986, Rio Algom Limited spent more than $30 000 000 on improvements designed to bring the Sussex mine up to its rated capacity of 635 000 product tonnes per year by April of 1987.

In 1993, the assets of Potash Company of America (a Division of Rio Algom Limited), including the New Brunswick mine and the Saint John port facility, were acquired by Potash Corporation of Saskatchewan Inc.

RESERVES AND GRADE On the basis of geophysics, surface and underground exploration drilling and mine development, PCS(NB) believes the mine has a proven reserve of 43 700 000 t of recoverable ore and 15 100 000 t of estimated KCl finished product. Based on proven reserve estimates, the operation has a reserve life of at least 20 years at current rates of full productive capacity (785 000 t of KCl product in 2001) and current technology (Source: PCS website, SEC form PCS 10-K405, p. 5; form filed 3/27/2002,). Probable reserves have been reported at 200 000 000 t (recoverable) with 69 000 000 t of estimated finished KCl product. Combined proven and probable reserves indicate a reserve life of a century or more at full current productive capacity and utilizing present available technology (PCS website, SEC form PCS 10-K405, p. 5; form filed 3/27/2002).

PRODUCTION Potash and salt production commenced in 1983. PCS(NB) has an annual production capacity of 785 000 t KCl (PotashCorp, 2001 Annual Report, p. 14). In 2001, 609 000 t of KCl product was produced, a 24% decrease from the previous year. (PotashCorp, 2001 Annual Report, p. 14). It appears that potash production was affected by a drop in world demand in 2001. Sales to Brazil, a major customer for New Brunswick potash were reported down by 17% forcing the company to take measures to reduce inventory and cut back on production.

In conjunction with its potash mining operation PCS(NB) also mines salt. In 2001 salt production was reported at 598 000 tonnes(PotashCorp, 2001 Annual Report, p. 14). Some salt is consumed regionally; however, most is trucked to and exported from the Port of Saint John. The material is sold exclusively to the salt division of Cargill Incorporated.

Employees Average of 405 persons for 2001.

Development In the late spring of 1998, a small brine inflow was discovered in a section of the mine. Since its detection, PCS(NB) officials have been vigilant in their analysis of the situation. The inflow continued to be monitored and controlled throughout 2001; however, it has contributed to increasing production cost at the facility (PotashCorp, 2001 Annual Report, p. 14).

Late in 2000, natural gas was discovered near the PCS(NB) Sussex mine site. Further evaluation of the "McCully Field" was continued in 2001 by PCS(NB) and its joint venture partner, Corridor Resources Inc. The company is optimistic that they will be able to utilize this potential energy source in their potash milling process (PotashCorp, 2001 Annual Report, p. 14).

Limestone, Dolomite, Marl

The upward production trend established in recent years at New Brunswick's limestone and dolomite operations leveled off between 700 000 and 900 000 t in 2001. A significant proportion of recent production had been sustained by the aggregate demand of new highway construction and related infrastructure in southern New Brunswick. In 2001, limestone and dolomitic limestone were processed from five operations: Brookville Manufacturing Company of Saint John; Elmtree Resources Ltd. near Bathurst; Graymont (NB) Inc. (formerly Havelock Lime, a Division of Goldcorp Inc.) of Havelock; Lafarge Canada Inc. of Havelock; and Upper Kent Lime Works Ltd., north of Bristol (Figure 9: 8–12). Another limestone operation, Kingsway Materials Ltd., situated 25 to 30 km east of Saint John (Figure 9: 13), established in 2000 also produced limestone as aggregate material although details related to production and related activities in 2001 is not known (for more information, see company website, www.atyp.com/kingsway/index.html).

The Province's limestone industry manufactures a range of chemical and pulverized products featuring agricultural, calcined and hydrated lime, flue gas desulphurization limestone as well as aggregate.

Brookville Manufacturing Company

Company Brookville Manufacturing Company, P.O. Box 2332, Station C, Saint John, New Brunswick E2L 3V6. Telephone: (506) 633-1200. The company's owner and General Manager is Malcolm Hoar.

Rights Mineral rights through Original King's Land Grant.

Location Brookville, East Saint John, Saint John County (Figure 9: 8). The quarry and crushing operations are between Highway 1 (Sussex–Saint John Highway) and Highway 100 (Rothesay Highway), approximately 2 km east of their junction. Access to the quarry is via the Rothesay Highway (NTS 21 H/5).

HISTORY The limestone/dolomite quarry and processing facility established at Brookville Manufacturing has a history of continuous operation for over 75 years (1920). The privately owned company primarily produces pulverized limestone and dolomitic limestone for the agricultural industry, a wide range of construction aggregate materials and other products.

Brookville, originally owned and operated by H.G.S. Adams, remained a family business until 1972 when it was purchased by Moosehead Breweries of Saint John. Moosehead succeeded in running the business almost 25 years before selling to its present owner and former Brookville employee, Malcolm Hoar, in 1994–95.

RESERVES AND GRADE Although resource estimates of limestone and dolomite at Brookville are not publicly available it appears there is an adequate stone supply for many years depending on its quality and availability at present levels of production. In 1998, a company official reported "about 70 years left in the life of the dolomite limestone quarry" (Heavy Construction News, June, 1998).

The calcium and magnesium content of the stone varies throughout the quarry, from areas of high-calcium limestone to areas of high-magnesium dolomite. Most production is centered in the more dolomitic areas where grades fluctuate from 40 to 45% $MgCO_3$.

PRODUCTION The company, which quarries and processes 200 000 to 300 000 t of limestone/dolomite each year, produces dolomitic agricultural lime, a wide range of aggregate for construction and other related purposes. Apart from New Brunswick, the company has marketed materials in Nova Scotia, Prince Edward Island, and the New England States.

Brookville has a long-standing history of supplying aggregate to the concrete industry. In 1998, the company was chosen to supply concrete aggregate for 15 000 m of pre-stressed concrete girders to be used on the 195 km highway construction project between Fredericton and Moncton in southern New Brunswick. The company maintains a stockpile of construction and agricultural materials in excess of 120 000 t, which are utilized in the manufacture of more than 40 different products.

EMPLOYEES Average of 20 persons in 2001.

DEVELOPMENT Similar to other limestone operations in New Brunswick, Brookville has been considering various options directed at expanding its product line into several new value-added agricultural and related products. The company continues to be a major supplier of aggregate material in southern New Brunswick.

Elmtree Resources Ltd.
(Sormany Quarry)

COMPANY Elmtree Resources Ltd., P.O. Box 665, Bathurst, New Brunswick E2A 3Z6. Telephone: (506) 546-6382. The Executive Officer and President is A. Buzas, and the Manager and Vice-President is M. Buzas.

RIGHTS Elmtree Resources Ltd. holds Quarry Lease No. 27 (84.3 ha) under the *Quarriable Substances Act*, Chapter Q-1, R.S.N.B. 1968 as well as Mining Lease 247 (161.1 ha; Armstrong Brook), Mining Lease

248 (171.3 ha; Sormany) and Mining Lease 249 (245.94 ha; Elmtree) and several claim blocks under the *Mining Act*, Chapter M-14.1, R.S.N.B. 1986.

LOCATION Elmtree operates a quarry and adjacent processing facility several kilometres west of Sormany, in northern New Brunswick (Figure 9: 9). The operation is about 30 km west of Bathurst, and adjacent to the Millstream River (NTS 21 O/9).

HISTORY Although the limestone near Sormany was mapped by J.L. Davies (Geological Surveys Branch) in 1959, it was not until 1982 that Elmtree Resources Ltd. mapped and sampled the deposit in detail. Two holes were drilled to further test the extent and grade continuity of the limestone at depth. Results were encouraging enough for the company to eventually proceed with quarry development and establish an on-site processing facility in the early 1990s.

In 1992, quarry operations shifted from the company's original Elmtree site near Petit Rocher to the present Sormany location, about 34 km to the southwest. All operations are consolidated at the Sormany site, with Elmtree's former location serving as a storage and distribution point for selected limestone products.

RESERVES AND GRADES Initial exploration (early 1980s) indicated possible reserves in excess of 8 000 000 t of limestone. Recent and more detailed reserve estimates are not publicly available.

PRODUCTION Between 40 000 and 50 000 t of flux-grade material is supplied annually to the nearby smelter at Belledune. In addition to this and other products, over 100 000 t of (>90% $CaCO_3$) limestone is supplied annually as a flue-gas desulphurization (FGD) agent to two hydrocarbon-fired power plants in northern New Brunswick. One facility is situated nearby (20 km) at Belledune while the other is at Dalhousie, 50 km north of the Elmtree operation (Figure 9: 10–11).

DEVELOPMENT A new quarry site was established a few hundred metres west of the original Sormany quarry in 1998. In 1999, both quarries were connected facilitating improved extraction efficiencies. The company is also considering development options on its Armstrong Brook dolomite property about 25 km west of Bathurst and plans to extract some stone for testing at its Sormany-based processing facility. The search for additional limestone and dolomite resources in the region resulted in several claims being staked to the east of the company's Sormany processing facility in 2000.

In 2001, Elmtree concentrated on extending and expanding the quarry operation at its Sormany site, 35–40 km west of Bathurst and began exploring (trenching and sampling) an interesting dolomite property a few kilometres east of its Sormany mine-processing operation

EMPLOYEES Average of 15 persons in 2001.

Graymont (NB) Inc.
(Havelock Quarries)

COMPANY Graymont (NB) Inc., 4634 Route 880, Havelock, New Brunswick E4Z 5K8. Telephone: (506) 534-2311. The General Manager is Frank Derrah.

RIGHTS Graymont (NB) Inc. holds Mining Lease 243 (355.0 ha) and Mining Lease 244 (182.4 ha), under the *Mining Act*, Chapter M-14.1, S.N.B. 1985. Lease 243 includes the operating quarry at Samp Hill and Lease 244 includes the plant. The company also holds several claim blocks in the Havelock, Sussex and Canaan areas.

LOCATION The company operates a quarry at Samp Hill (Figure 9: 12), about 5 km west of Havelock. A processing facility is situated less than 1 km east of the Village (NTS 21 H/13W).

HISTORY Quarrying has been on-going in the Havelock area since 1938 by Havelock Lime Works Ltd., Havelock Lime (a division of Goldcorp Inc.), and Graymont (NB) Inc. The original company was incorporated in 1964, and in 1970 a subsidiary company, Havelock Processing Ltd., was formed to manage the manufacturing of quick and hydrated lime. In 1984, Dickenson Mines Ltd. purchased 60% interest in the Havelock group of companies. In 1987, the remaining 40% was acquired.

In 1989, Goldcorp Inc. gained control of Dickenson Mines and it's affiliated companies. Fives years later (1994) the assets of Goldcorp, Dickenson, and two other companies were reorganized into a new corporate structure and at that time Havelock Lime's company name was modified to reflect the new corporate identity – Havelock Lime (a division of Goldcorp Inc.).

Since Dickenson's purchase of Havelock's assets, several improvements to the facility have been realized. Some of these have included the construction of a 330 t/d annular-shaft kiln (completed in 1989) to improve fuel economy, provide increased production capacity and provide long-term market competitiveness. A new 10 t/h hydrator improved production efficiency and in 1991, a wash plant was commissioned, providing better-quality stone feed to the kiln.

In 1996, Havelock Lime's reputation as a marketer of quality lime products was enhanced by its qualification for the internationally recognized ISO 9002 quality assurance accreditation.

To assist in funding requirements pertaining to the redevelopment of its Red Lake gold mine in northwestern Ontario, Goldcorp announced late in 1999 that it was selling the Havelock Lime operation. The sale was completed on December 31, 1999 for a reported net proceeds of US$ 20 588 000 (Cdn$29 650 000) to Graymont Ltd. of Vancouver, British Columbia (Heavy Construction News, June 1998). Graymont, a privately owned Canadian corporation, is the third largest lime producing company in North America. The Havelock facility, renamed Graymont (NB) Inc., is to be closely associated with Graymont's three lime plants and associated quarries in Quebec [Graymont(QC) Inc.].

RESERVES AND GRADE Limestone requirements are partially supplied from the company's Samp Hill quarry with up to 400 000 t purchased annually from the neighboring Lafarge North America Inc. quarry under the terms of a negotiated multi-year limestone supply agreement. In its 1997 Annual Report, Goldcorp Inc., Havelock's former parent company, indicated that at the current rate of production Havelock Lime has limestone reserves to last approximately 30 years. Although not fully delineated, total reserves from company holdings in the Havelock area were estimated at 8 300 000 tons (Goldcorp Inc., Annual Report, 1997).

PRODUCTION The company processes between 300 000 and 400 000 t of limestone annually. Chemical process stone (for use as flux in nonferrous smelters, the glass industry, pulp and paper mills, and fibreglass), pulverized stone (for use in dusting mines and for agricultural purposes), poultry grit, and crushed stone (for use as concrete aggregate and for general construction) are currently produced. Havelock's lime and related limestone product revenues for 1999 were reported at just over $12 000 000, representing a slight increase over 1998 largely due to significant growth in aggregate sales and strong sales in calcined and hydrated lime (Management's discussion and analysis: 1999 Consolidated financial statements, Goldcorp Inc.). Havelock [Graymont (NB) Inc,] remains the only source of quick and hydrated lime in the Maritimes.

EMPLOYEES An average of 51 persons in 2001.

DEVELOPMENT Over the last few years, Havelock Lime [Graymont (NB) Inc.] has been consolidating and extending reserves of high-calcium limestone in the Havelock area. Proposed quarry expansions continued in 2001 with preliminary planning and predevelopment work undertaken at two locations. Development activity at Havelock's Samp Hill quarry included the extraction of high-magnesium limestone along with more than 200 000 t of cap rock and lower grade limestone sold to the Miller Group to meet strategic construction material requirements for the Fredericton to Moncton highway project in this part of New Brunswick. Excavation of this material has assisted in the economic recovery of higher value, underlying reserves of steeply dipping, high-calcium limestone, thus extending the life of the quarry by several years. Reclamation work continued in various parts of the quarry.

In 2001, Graymont continued quarry operations at Lafarge's McGee quarry and are in the process of expanding it to west. The company also removed a bulk sample of limestone from a proposed new future quarry site a few kilometres north of its Havelock processing facility, near Hicksville. This sample was used for successful testing trials involving their annular-shaft kiln.

Lafarge Canada Inc. (subsidiary of Lafarge North America Inc.)
(Havelock Quarries and Cement Plant)

COMPANY Lafarge Canada Inc. The plant address is 4877, Route 880, Havelock, New Brunswick E4Z 5C1. Telephone: (506) 534-2301. The Manager is Arnold Mallais. Website: www. lafargecorp.com

RIGHTS Lafarge Canada Inc. holds Mining Lease 245 (632.5 ha), which includes the existing plant and quarries, and Mining Lease under the *Mining Act*, Chapter M-14.1, S.N.B. 1985. The company also holds mineral claims on a limestone and a gypsum property near Havelock and Petitcodiac, respectively.

LOCATION The limestone quarries and cement plant (Figure 9: 13) are adjacent to Highway 880, about 5 km east of Havelock, Westmorland County (NTS 21 I/3W).

HISTORY Limestone quarries near the plant have been supplying raw material for the manufacture of cement since 1952. After 1982, production of cement from local raw materials was limited to fulfilling market requirements for oil well and other specialty cements. The plant was maintained as a grinding operation for imported Nova Scotia clinker until 1987 when the company closed its cement production facility; however, it continues to quarry stone used for other purposes. The plant property now serves only as a distribution point for products from another company operation in the Maritimes.

The McGee quarry was opened in 1986 just north of Highway 880, less than 1 km east of the plant. This property, partially investigated in 1976, was known to contain extensive reserves of high-calcium limestone. A drilling program was undertaken in 1985 to verify the quality and extent of the deposit prior to the establishment of the new quarry site.

Since opening the McGee quarry site, Lafarge has supplied limestone to an unrelated lime plant operating at Havelock. The operation has also supplied limestone from other quarry locations on its property for the manufacture of various specialty cement products at a company cement plant in Nova Scotia. Aggregate material has been supplied to regional operations of Lafarge Construction Materials (i.e., ready-mix cement plants) on an as-required basis for several years. The company continues with an impressive reclamation program at former quarry locations.

RESERVES AND GRADE Potential medium- to high-grade limestone (i.e., 50–53% CaO) resources are estimated to be fairly extensive on properties held under mining lease by Lafarge Canada Inc., although no specific values are publicly available. In addition, the company maintains a 288 ha claim block in the Springhill area several kilometres southwest of the former cement plant and its adjacent quarries.

PRODUCTION Historically, Lafarge has produced up to 400 000 t of limestone annually, primarily for use in cement manufacturing. However, since the closure of its plant, 15 years ago, stone specifically quarried for cement production has been minimal. Despite the closure of its Havelock cement operation, Lafarge has continued to produce stone mostly from its McGee quarry, selling 300 000 to 400 000 t annually to Graymont (NB) Inc. Intermittent production in the range of a few tens of thousands of tonnes a year is shipped on-demand to Lafarge's Nova Scotia cement manufacturing operation at Brookfield, company ready-mix operations in Sussex and Moncton and other local markets.

EMPLOYEES Average of 3 persons in 2001.

DEVELOPMENT. Lafarge Canada Inc.'s Havelock operation continued to supply limestone from its quarries in 2000. In addition to this limestone production, the company processed and stored 50 000 to 60 000 t of magnesium limestone for Graymont (NB) Inc. from that company's Samp Hill quarry, 5 km west of Havelock.

Lafarge had a very good year, supplying over half a million tonnes of stone primarily to Graymont (NB) Inc's lime plant nearby, to Maritime Road Development Corp. for the Fredericton to Moncton highway project and Lafarge's cement operation in Brookfield, Nova Scotia. Lafarge also provided crushing services and dry storage to Graymont for agricultural lime and a gypsum product. The company also undertook a mapping and limited drilling project on its Springhill claims, 5 km southwest of its Havelock operation.

Upper Kent Lime Works Ltd.

COMPANY Upper Kent Lime Works Ltd., R.R. 3, Bath, New Brunswick E0J 1E0. Telephone: (506) 278-5359. Contact person is Douglas Lloyd.

RIGHTS Upper Kent Lime Works Ltd. holds Mining Lease 242 (16.2 ha), under the *Mining Act*, Chapter M-14.1, S.N.B. 1985.

LOCATION This marl deposit (Figure 9: 14) is in the bottom of a partially drained lake at Maplehurst, 15 km north of the Village of Bath (NTS 21 J/12).

History The deposit has been worked since the late 1950s and was acquired by the present owners in 1973.

Reserves and Grade Less than 30 000 t of marl ranging between 85% and 95% $CaCO_3$ remain at this location.

Production Marl is extracted from a shallow lake bottom using a dragline, spread on the adjacent hillside to dry, and stockpiled. It is then screened to remove pebbles, twigs, etc., and trucked to local farmers for use on potato fields. The main operating period is late April to June. An additional two- to three-week period of operation typically occurs in the fall to stockpile material. Annual sales vary but are generally less than 2000 t.

Employees 3–4 persons (seasonal)

Development Continued operation.

Silica

Atlantic Silica Inc.

Company Atlantic Silica Inc., 4 Osborne Road, Poodiac, New Brunswick E4E 5K5. Telephone: (506) 433-5890. Fax: (506) 433-4619. President and General Manager is Robert Pickett.

Rights Atlantic Silica Inc. (formerly Sussex Silica Inc.) holds Mining Lease 241 (599.8 ha), under the *Mining Act*, Chapter M-14.1, S.N.B. 1985.

Location This deposit of unconsolidated silica sand and pebbles (Figure 9: 15) is about 16 km southwest of Sussex, immediately northeast of Cassidy Lake (NTS 21 H/12E).

History The deposit was discovered in 1981. After identifying sufficient reserves of high-quality sand, a pilot plant was set up in 1983 for product testing and marketing. Full-scale production began in 1986. In the fall of 1986, the company mined several thousand tonnes of lump silica and sand of various sizes. The lump silica was used in the manufacture of silicon metal and silicon carbide at Becancour, Québec. The company's assets were acquired in 1993 from Baskatong Quartz Ltd. (Sussex Silica Inc.)

Reserves and Grade In the late 1990s, company literature (Atlantic Silica fact sheet, 1997) reports proven reserves of 25 000 000 t of unconsolidated quartz sand and pebbles in association with minor amounts of kaolin clay. The silica approaches 100 % SiO_2, 0.04–0.15% Fe_2O_3; 0.02% CaO; 0.15% Al_2O_3 and trace amounts of TiO_2.

Production Existing capacity of the operation is estimated at 100 t/h.

Employees An average of 5 persons in 2001.

Development The company has marketed several specialty products, including sand blasting material; filtration, tree nursery, and decorative sands; and sands used in the manufacture of glass and fibreglass. In 1998, Atlantic began supplying silica for a Sussex-based manufacturer of agglomerated tiles for interior and exterior floor and wall applications.

Chaleur Silica (a Division of The Shaw Group)

COMPANY Chaleur Silica (an operation of Shaw Resources), P.O. Box 60, Shubenacadie, Nova Scotia B0N 2H0. Telephone: (902) 883-2220. FAX: (902) 758-3622. Contact person is Glen Hardie. Website: www. shawgroupltd.com

RIGHTS Shaw Group has a 27-acre lease agreement with the landowner.

LOCATION The Bass River silica quarry (Figure 9: 16) is immediately south of Highway 11, approximately 6.5 km east of Bathurst, Gloucester County (NTS 21 P/12E).

HISTORY The property was originally explored by East Coast Smelting and Chemical Company in 1961, but the property remained undeveloped until 1974 when World Wide Explorations opened a small quarry. Purchased by Godin M-E in 1976, the operation was expanded and modernized. It was operated under the name Chaleur Silica Limited until the late 1980s. In 1992, the Shaw Group Limited of Nova Scotia purchased the company, changing the name of the operation to Chaleur Silica.

RESERVES AND GRADE An estimate of reserves is not available for this property. The resource is primarily a quartzose sandstone with an average SiO_2 content of 90%.

PRODUCTION The quarry operates on a seasonal basis. The market depends almost entirely on the sale of silica flux to the Belledune smelter. Annual production is generally between 20 000 and 25 000 t of 0.5 inch minus material.

EMPLOYEES Information is not available but the number is expected to be 2 to 3 seasonal.

DEVELOPMENT Material is excavated at Bass River and crushed and sized in Petit Rocher. Plans are to continue the operation depending on market demand and availability.

Natural Stone

The quarrying and working of stone for various applications, once an important sector of New Brunswick's mining industry, continues to shown signs of a modest revival. Although there are several companies supplying stone products in the province, only a few actually quarry and process local stone. Both granite and sandstone are worked on demand.

The New Brunswick stone industry today bears no resemblance to that of former decades. Nonetheless, a few companies continue to quarry stone generally on demand in the southern part of the Province, shaping it into monuments, curbing, streetscaping and landscaping stone, stone for new buildings and restoration material. These companies include: Nelson Monuments Ltd. of Sussex, Smith Cut Stone and Quarries Limited of Shediac, Maritime Stone Works Inc. of Scoudouc, and Bastarache Stone Quarrie near Notre Dame (Figure 9:17–21).

A new stone venture that became firmly established in 2001 is one that supplies high-quality flagstone from the Hillsborough area (Figure 9: 22), a half-hour drive south of the city of Moncton. T. P. Downey & Sons, a local lumber company, began examining the production and marketing potential of laminated limestone in 2000. Starting with the production of simple pit-run material, the company has recently expanded into several rough and cut flagstone products that are graded on the basis of size, thickness and color. The operation has become more mechanized, utilizing several pieces of sorting and grading equipment. A computerized circular diamond saw and a stone splitter are used to trim stone to specific sizes and shapes. The company has sent stone shipments to the United States and Ontario as well the regional Maritime market.

Another natural stone operation has been reported in south-central New Brunswick near Grand Lake (Figure 9: 23) where Grand Lake Flagstone hand quarries various shapes and sizes of flaggy sandstone. They also provide an installation service.

Mineral Aggregate

The production of mineral aggregate from bedrock and granular deposits (sand and gravel) is fairly widespread throughout New Brunswick (Figure 9: 24–30). Because of a shortage and variability of pit-run material from many granular sources and the increasing costs of processing required to meet tighter construction specifications, there is an increasing preference toward the use of bedrock (crushed rock) as a source of aggregate materials.

Dozens of small companies and independent contractors extract sand and gravel and related materials from numerous pits that, with few exceptions, are operated on an intermittent-demand basis. While many operations produce low-specification pit-run or borrow material, several companies produce good quality material from large deposits. These are more permanent operations that lie within economical trucking distance of high-demand urban areas.

The bulk of the province's crushed rock is produced from ten to fifteen quarries; most are strategically situated near higher-demand centres or areas lacking in quality granular materials.

The 1990s have seen an unprecedented amount of highway and related infrastructure construction in New Brunswick. The present focus on upgrading the Province's major highway system(s) has led to considerable interest in locating and developing sources of high-performance mineral aggregate. Such projects have resulted in the establishment of several new strategically positioned pits and quarries at several locations throughout the province.

Apart from meeting increased requirements for the domestic market, the export of mineral aggregate from New Brunswick tidewater locations began in the mid-1990s and continues to gain momentum as a realistic alternative to resource development. Beginning with shipments of sand into the New York area, aggregate export recently has expanded to include bedrock that has been quarried and processed at an industrial park immediately adjacent the port facility at Bayside in southwestern New Brunswick (Figure 9: 31). Combined annual shipments of these materials are probably in the range of 300 000 to 500 000 t and now form a significant part of port traffic at Bayside. Aggregate exports from New Brunswick ports are also being considered by other interests.

HYDROCARBONS

Coal

N.B. Coal Limited

COMPANY N.B. Coal Limited, P.O. Box 520, Minto, New Brunswick E0E 1J0. Telephone: (506) 327-3336. The President is Mr. A. Cormier. The parent company is NB Power.

RIGHTS N.B. Coal Limited holds a Coal Agreement, under the *Mining Act*, Chapter M-4.1, S.N.B, 1985, in the Minto–Chipman area.

LOCATION The Minto-Chipman coalfield (Figure 9:32) is approximately 60 km east-northeast of Fredericton (NTS 21 I/4, 21 J/1).

History (For early history see Miscellaneous Report 13, "New Brunswick's Mineral Industry, 1993.")

RESERVES Current reserve figure is not known.

PRODUCTION 163 466 t of coal (2001); 204 118 t of coal (2000)

EMPLOYEES In 2001–2002, an average of 76 persons, not including contract truckers.

DEVELOPMENTS N.B. Coal Limited operates for eight months each year.

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